

January 27, 1958

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# AMERICAN AVIATION



## Ski-Jump with Jet Assist

A new version of the Fairchild C-123 is now flying with the USAF. Its wheel-ski combination gear enables it to operate from ice or snow-covered fields as effectively as from unprepared dirt strips.

Takeoff performance shoots up with the addition of a Fairchild J44 jet engine at each wing tip. Substantial increases in payload have become possible—takeoff and landing weights over 60,000 lbs. have been achieved and will become routine.

The ski-and-jet C-123 is typical of the versatile development and the potential Fairchild builds into its aircraft.



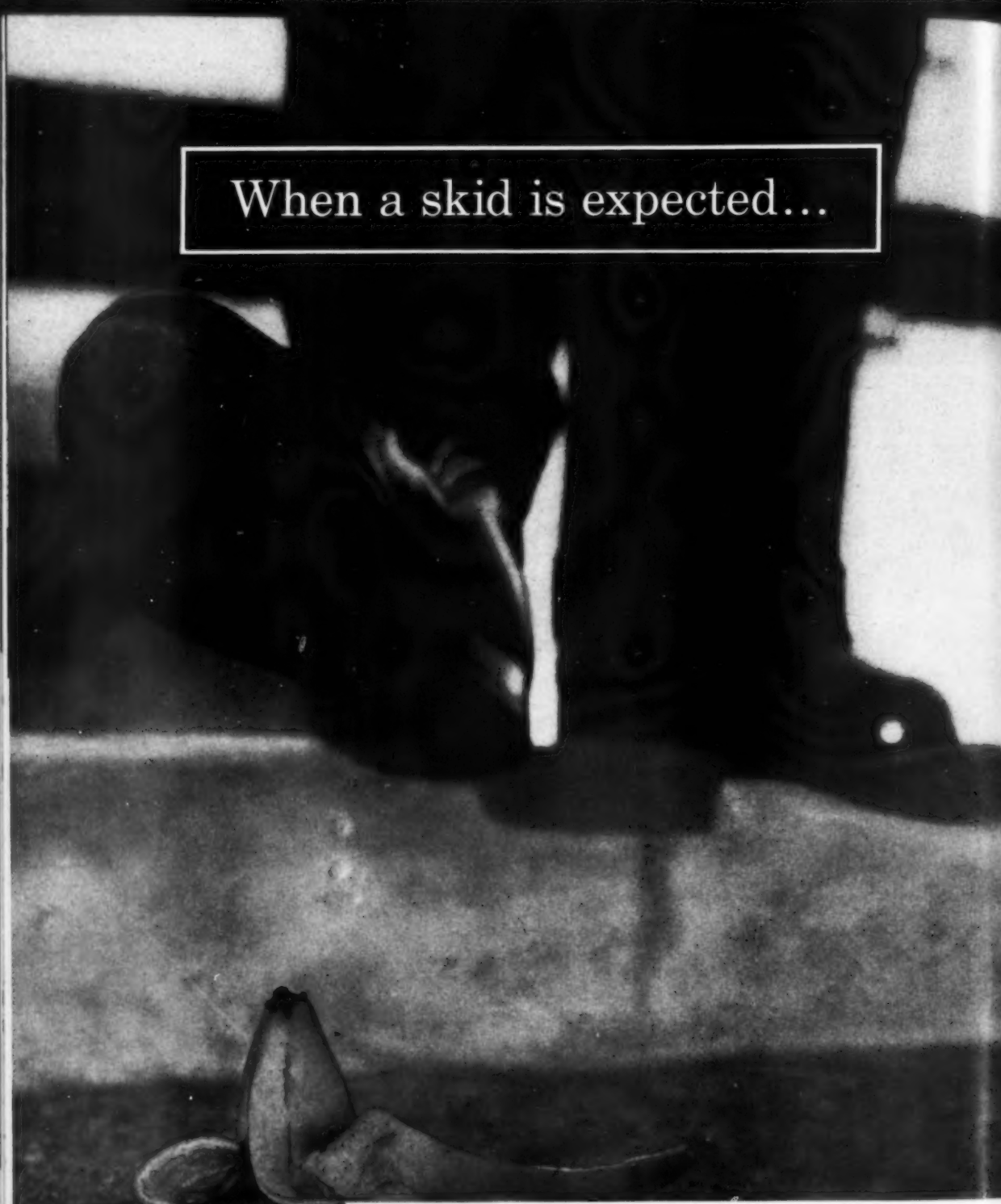
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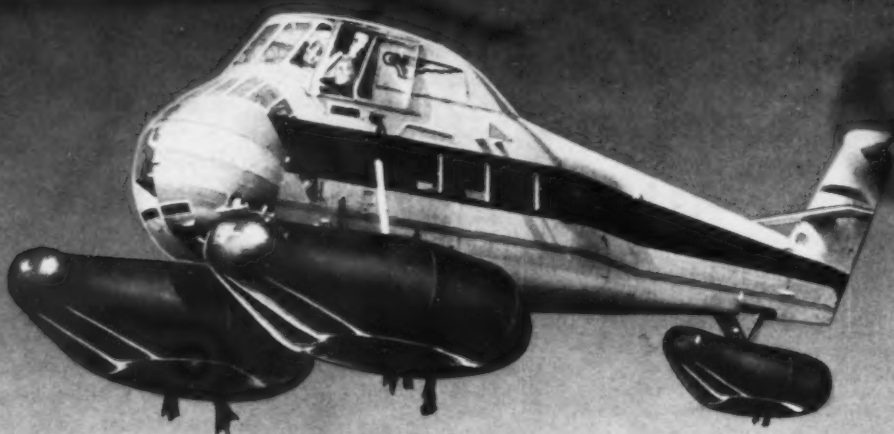
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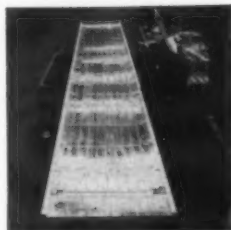


# AMERICAN AVIATION

WORLD'S LARGEST AVIATION PUBLISHERS

## Design report on Grumman's Gulfstream

Design and engineering details of Grumman Aircraft Engineering Corp.'s new entry in commercial aircraft market, turboprop Gulfstream, are analyzed by William Beller. Page 22.



## Topic of the month: Aeronautical purchasing

AMERICAN AVIATION in this issue launches the first of its industry feature themes with a special 12-page supplement on this important topic. For index, see page 27.



## Aero Design offers pressurized Commander

Two years of development went into this new executive aircraft, which also is air-conditioned. Skeptics said it couldn't be done with Model 680, but Aero did it. See page 43.



## Bendix develops 3-dimension radar system

Strikingly different radar called "Rapier" has been developed by Bendix Radio Div., Bendix Aviation Corp. Among other things, it will help update SAGE warning system. Page 45.



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### PHOTO CREDITS

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Coming next issue in AMERICAN AVIATION (Feb. 10) . . . Second in an exclusive series on business aircraft operation. How to select, train, and maintain proficiency of flight crews, a matter of extreme importance in shaping the safety, dependability and effectiveness of your business aircraft operation. For first of series co-authored by consultants R. Dixon Speas and J. J. Casey, see AMERICAN AVIATION, Jan. 13, page 41.

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## Florida—Somebody Needs to Do Some Blasting

ONE FINE WAY to use up costly aircraft is to belly-land them in the Florida swamps. Early in January a USAF C-97 circled Homestead AFB and then Miami International for a total of four hours until it ran out of fuel and the pilot crash-landed in the Everglades twenty miles west of town. With so many good airports within easy range, it was certainly somebody's bad judgment that a four-engined airplane was kept in the area for four hours and then thrown away.

The main runway at Homestead AFB was blocked by an accident and Miami wouldn't give clearance because of instrument traffic. But instrument landing traffic control at Miami International is among the worst in the country. Probably because the airport is rarely completely closed on account of weather, there is a notable lack of experience in handling traffic when conditions are bad. The situation is complicated by the large numbers of planes coming in from Central and South America with pilots who are none too familiar with traffic control. CAA needs to do something about Miami—and soon.

But even more to the point is the Weather Bureau. All over the country the entrenched civil service in the WB has turned in a pretty sad performance on forecasting. In southern Florida, perhaps due to local chamber of commerce pressure, the weather is never bad and the forecasts are always delightful—and misleading.

It can rain cats and dogs without interruption in Florida for 36 hours before a WB forecast will ever mention the word "rain". It's always "showers"—breezily passed out by a WB bird broadcasting from his office over the local radios. The northeaster which hit South Florida viciously early in January was not accurately forecast in any way or even reported at the time. After it was all over the WB called it the worst winter storm since the WB was established in Miami in 1911. The forecasts and the weather reports were absolute lies and distortions. And all for the tourist season? (We were there, we know.)

It is probably impossible to upset the entrenched WB civil service, but we wish they would stop asking for funds from Congress for research on controlling the weather. They need to learn first how to forecast it. It's so bad that a brand new private enterprise of weather forecasting has grown up—and these companies use the basic information gathered by the WB but which WB can't seem to utilize itself. It's pretty sad.

### A Staggering Bill

One item in the national budget presented to Congress this month gave all of the flying business a severe jolt. The federal aviation gas tax

would be boosted from two cents to three and a half cents as a sort of user fee for the cost of the federal airways system.

Not only the airlines, but all business and other aircraft would be hit hard. No one questions the need for an aviation contribution to the cost of building and maintaining the airways system, but the proposed increase becomes astronomical in any sort of projection into the future.

During 1957 the scheduled airlines alone paid about \$25 million in fuel taxes. If the 3½¢ tax had been in effect the tax bill would have been \$43 million. But the combined airline profits totaled only \$25 million. Now the administration proposes not only a hefty gas tax hike, but a jet fuel tax as well. The Air Transport Association estimates that in the period 1958-62 the airlines would pay \$534 million in taxes. Since the military services also use the airways, there is no possible excuse for such a hike. So, along with all of the multitude of other problems faced by the carriers, another battle line of survival must be strung up.

### Trouble Ahead

There are some scandals brewing in the business aircraft field and NBAA or some other responsible interests had better move to clean things up or the entire business aviation field is going to suffer from a boomerang.

The scandal? Well, let's put in blunt terms what is being gossiped about over the country. A lot of big corporations have bought fleets of fine airplanes. More often than not, the top pilots of these fleets have become great pals of the top corporation executives who have taken a great liking to flying in company airplanes.

But some of the pilots have taken advantage of a good thing. Having been given full decision responsibility for purchase, modifications, maintenance and overhaul—usually beyond the reach of corporate auditing jurisdiction—they began getting ideas and some of the local operating companies were only too willing to cooperate in order to get the business. (In some cases the operators started the ball rolling.) First it was little favors, then gift automobiles or similarly high-priced touches. In the past year these "touches" have grown bigger and bolder—into the realm of big dough.

The result? Not only a breach of ethics, but the cost of operating business aircraft is going higher and higher to cover the "touches" and favors. Some corporations are going to clamp down on the use of business aircraft because of high operating costs without ever knowing that there was a lot of under-the-table "take" involved. The time to stop is right now before it hurts everybody.

Wayne W. Parrish





## Is it possible to build a **MAN**?

"Theoretically, yes," said the scientist. "Or a reasonably remarkable imitation—a kind of mechanical analogue. Call it a habit machine, a mechanism operating according to the laws of the conditioned reflex."

*You mean that you could actually build a mechanical mind? One that would exhibit emotions—such as love, fear, anger, loyalty?*

"We're doing something like that now in advanced missile development," the scientist replied. "In a limited, highly specialized way, of course."

"Take the 'pilot' that is being developed for the big long-range missile. *He* has a wonderful memory, and can solve many complex navigational problems in a flash. *He* loves perfection, and actually becomes highly excited when *he* gets off course. *He's* a tough-skinned character, impervious to the cold at several hundred miles altitude and the incredible heat at re-entry. And *his* loyalty is heroic. *His* life is a single mission, the mission *his* whole life...and maybe ours, too. *He's* a pretty important fellow."

*What about the complete man-made Man? What would that entail?*

"A mechanism the size of the capitol in Washington, and the best scientific resources in the world. But it could be done. You see, it's only a question of how physical matter is organized. As a great biophysicist explained, 'If material is organized in a certain way, it will walk like a man. If it is organized in another way, it will fly like a missile.'"

*Still, wouldn't there be something missing in the complete man-made Man—something very important?*

"Yes," said the scientist. "A soul."

# MARTIN

BALTIMORE · DENVER · ORLANDO

JANUARY 27, 1958

## LETTERS

### McElroy: detergent?

To the Editor:

While reading James J. Haggerty, Jr.'s article entitled "Sputniks dull the economy axe" (AMERICAN AVIATION, Dec. 2, p. 33), a rather amusing thought occurred to me. It is only logical that Neil McElroy should have been selected Secretary of Defense, for what could be better than a good detergent to clean up a mess?

Also, in reference to Mr. Haggerty's closing paragraph on the Navy's fleet ballistics missile: more power to the Navy. We should have had missile-launching capability in our submarine fleets a year ago, but since we now have none in quantity, it's time something is being done to correct this deficiency. This article indicates that something is being done, and here is hoping that Polaris lives up to expectations. JOHN T. TAYLOR, Alpha, N. J.

### Matter of interpretation

To the Editor:

I am surprised to see how negative your article is in the Dec. 16 issue, on the economy priced services of the South American airlines. From the chart given, there is little indication that these airlines are taking business away from the I.A.T.A. carriers. Quite the contrary, and as you admit, they are creating a new market which would not in any case be available to the I.A.T.A. carriers because of their higher fares.

This creation of a new market by lower fares has been proved time and time again. Everybody should be for it because (a) it broadens the airline traffic in general to the ultimate benefit of all airlines and (b) it assures a market for slower aircraft, which the I.A.T.A. carriers are no longer using. S. HELGASON, Vice Chairman, Loftleidir, Reykjavik, Iceland.

(EDITOR'S NOTE: Reader Helgason who is vice-chairman of the only non-IATA transatlantic carrier, should take another look at the chart on page 52 of the Dec. 16 issue. It shows substantial gains by the major Chilean cut-rate carrier and a drop in sales by Panagra.)

### Bouquet for En Route

To the Editor:

I have read many articles on New Guinea, but I feel that in reading "En Route" you most certainly have been giving our Territory a terrific write-up.

Whether you are aware of it or not, to have three separate articles on New Guinea, only one of the many other places you visited, speaks for itself, and we are proud to think that you, as the leading aviation writer of the world, have seen fit to write of our little operation in this outback corner of the globe and that you left us with such an impression. ORM DENNY, Manager, Qantas Empire Airways, Lae, New Guinea.

### Add compliments

To the Editor:

Your article (How ceramics help metals beat heat barrier, AMERICAN AVIATION, Dec. 16, p. 43) . . . was excellent and I thank you for all the credit you have given to my work . . . DR. PAUL A. HUPPERT, Gulton Industries, Inc., Metuchen, N. J.



## SPOTLIGHT

Chance Vought Aircraft, which now holds a hefty \$700-million backlog—principally for manned aircraft—will fly its new F8U-3 this year. Company has a \$100-million contract for the Mach 2 version of the Crusader. Powerplant will be a Pratt & Whitney J75-5 with afterburner. F8U-1 has the P&W J57-P6 and the F8U-2 is powered by the J57-P12. The Dash-3 will not be redesignated F9U, since it is an outgrowth of the two previous Crusaders.

**Funds for Air Force's recent \$40-million order for additional Douglas C-133 turboprop transports are reported to have come directly out of Maj. Gen. Bernard Schriever's Ballistic Missile Div. budget. Reason: The big cargo carriers are needed if AF is going to transport its ICBMs by air.**

Southwest Airmotive Co. will complete its 10,000th Air Force engine overhaul by Feb. 1. Of these, more than 4,000 were Allison J33s, which power the Lockheed T-33 and F-80. Southwest started overhauling AF piston engines in June 1950, took on jets in 1955. In addition, company has overhauled nearly 5,000 commercial engines, principally P&W R985s, and also is working on Navy jets.

**Regent Manufacturing Co., Los Angeles, has developed a 100-ton jack that Air Force uses in rotating tires on the Boeing B-52.**

Bogus engine parts still are plaguing the general aviation industry, but CAA is cracking down on producers to make sure substitute parts conform to specifications. One of major problem areas is crankshafts—castings substituted for forgings.

**Watch for Aero Design & Engineering Co. to come up with a turboprop-powered Commander in the not-too-distant future. Project awaits availability of engines—probably the Lycoming T53.**

Army is using Aero Commanders in its SLAR (side-looking airborne radar) project. Huge slab-type antennas are installed on both sides of the Commander, which is exceptionally adaptable because of its high wing. SLAR is under evaluation at Ft. Huachuca, Ariz., Electronic Proving Ground. Systems are serviced at Motorola's Western Military Electronics Center at Phoenix. Original SLAR design was conceived at the University of Illinois.

Convair's 1957 output of 175 Metropolitan 440s brought to 1,051 the total of Convair-Liner types built during the past eight years. Company will turn out 25 of these aircraft this year, with final phaseout late in March, after which the factory space will become available for 880 jet production.

Boeing-Wichita has a half-mile system of underground sluice draws and tunnels to collect daily output of tons of aluminum chips made by 16 high-speed mills working on B52G wing skins. System carries chips to a central collection building where they are cleaned and prepared for salvage. It was built at a cost of more than half a million dollars.

Solar Aircraft Co. has gas turbines even smaller than its 55-hp Titan under study. The Titan, designed for one-man helicopters and flying platforms, will be ready for military evaluation within a year to 18 months.

Continental Can Co., Coffeyville, Kans., and Convair are supplying the power packages for Convair's B-58, not Rohr Aircraft, as reported here Dec. 30.

**A new amphibian based on the original Republic Aviation Seabee design is under development at American Aviation Corp., Free-land, Mich. Company says it is confident of good sales potential for the amphibian. The project is awaiting "a new and satisfactorily powered and designed engine."**

## When and Where

### FEBRUARY

- AIEE winter general meeting, Hotels Statler & Sheraton-McAlpin, New York, Feb. 2-7.
- Industry-Service Symposium, flight control-panel integration, Biltmore Hotel, Dayton, Ohio, Feb. 3-4.
- Reinforced Plastics Div. Conf., Society of the Plastics Industry, Edgewater Beach Hotel, Chicago, Feb. 4-6.
- ATA Maintenance Facilities Subcommittee, Muehlbach Hotel, Kansas City, Mo., Feb. 4-6.
- Annual Ohio-Indiana agricultural aviation conference, Ohio State University, Columbus, Ohio, Feb. 26-27.

### MARCH

- ASME Gas Turbine Power Div., conference and exhibit, Shoreham Hotel, Washington, D.C., March 2-6.
- National Conference on Aviation Education, National Aviation Education Council, Mayflower Hotel, Washington, D.C., March 13-14.
- ARS-ASME joint aviation conf., Statler-Hilton Hotel, Dallas, March 17-20.
- National Assn. of Corrosion Engineers, symposium on aircraft corrosion problems, San Francisco, Calif., March 17-21.
- Interservice and Industry Symposium on Guided Missile Training Equipment (secret clearance only), Naval Ordnance Lab., Silver Spring, Md., March 18-19.
- IRE national convention & radio engineering show, Waldorf-Astoria Hotel, New York Coliseum, March 24-27.
- International Instrument Show, Caxton Hall, London, March 24-29.

### APRIL

- Aeronautical Training Society annual meeting, Mayflower Hotel, Washington, D.C., April 10-11.
- American Helicopter Society annual national forum, Sheraton-Park Hotel, Washington, D.C., April 16-19.
- Electronics components conference, AIEE, IRE, EIA, WCEMA, Ambassador Hotel, Los Angeles, April 22-24.

### MAY

- National Flight Test Instrumentation Symposium, Instrument Society of America, Park Sheraton Hotel, New York, May 4-7.
- American Assn. of Airport Executives, annual business meeting and convention, Hacienda Motel, Fresno, Calif., May 4-7.
- Air Mail Pioneers anniversary ball, Beverly Hilton Hotel, Beverly Hills, Calif., May 16.

### JUNE

- American Rocket Society semi-annual meeting, Hotel Statler, Los Angeles, June 8-11.
- ASME semi-annual meeting, Hotel Statler, Detroit, June 15-19.
- National Convention on Military Electronics, Sheraton-Park Hotel, Washington, D.C., June 16-18.

### SEPTEMBER

- SBAC Flying Display & Exhibition, Farnborough, England, Sept. 1-7.
- National Business Aircraft Assn. annual meeting, Bellevue-Stratford Hotel, Philadelphia, Sept. 22-24.

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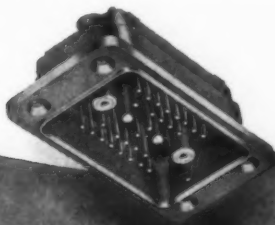
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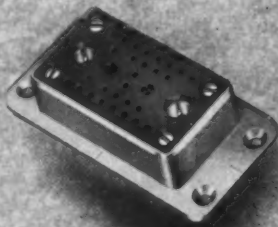
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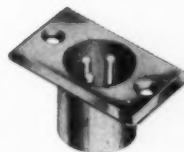
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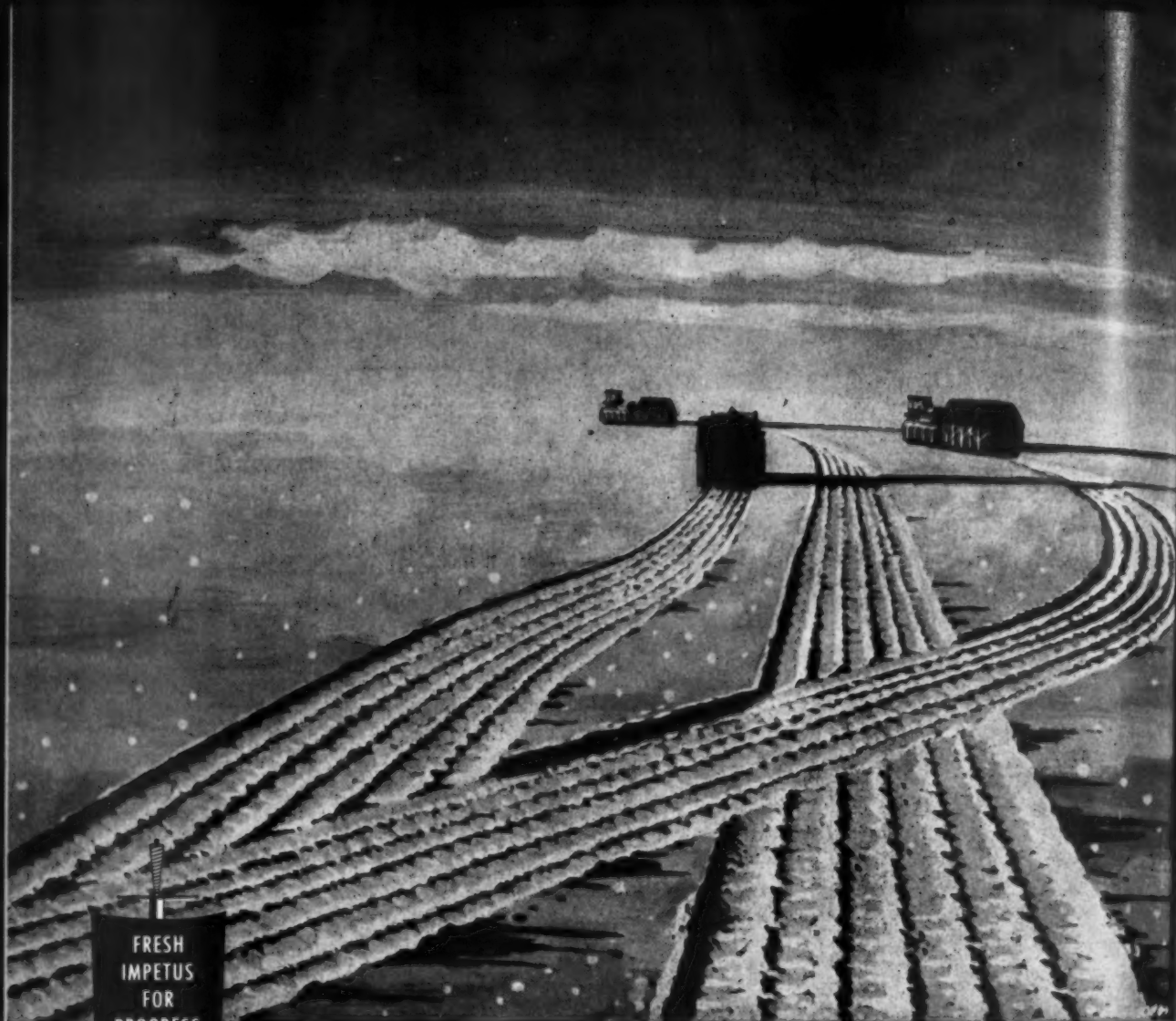


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## AIRTRENDS

**USAF is pushing for more money for the X-15 research aircraft** and for a demonstration of the boost-glide principle. It also wants to accelerate the Titan missile in order to use its propulsion system as a booster for the X-15. Estimates indicate this would require an additional \$5.2 million for fiscal 1958, \$15 million in fiscal 1959 research funds and \$22 million in 1959 production money. These items, not now included in budget requests, are promised a thorough hearing in connection with the 1959 budget.

*Also being urged is a real push to speed development* of the WS-110A chemical bomber. Estimated cost: \$10 million more in fiscal 1958 production funds plus \$2 million in R&D and \$30 million in production money in fiscal 1959.

**Chances are good that an additional fund will be provided** to protect the capability to produce B-52s, if decision is made in the next six months to a year that more B-52Gs are needed. Signs point to the fact that if the Defense Dept. doesn't approve the program, Congress may, as it has in the past provide for the B-52. Originally, USAF wanted 17 wings of heavy bombers, but this target has now been cut to 14 by USAF Chief of Staff, Gen. Thomas White. USAF is funded for 11 wings.

**Need for an additional \$200 million for USAF procurement** "other than aircraft" is cited by Gen. Curtis LeMay, Vice Chief of Staff. He told the House Defense Appropriations Subcommittee that, to a large extent, this money is needed for ground support of aircraft in the program or already in service. These include the F-102, which LeMay says is very short of ground support equipment, and the B-52, which is also short and will be even shorter under new dispersal concepts.

**More authority goes to 19 Air Materiel Command Weapon System Project Offices** under an order signed by Gen. Edwin B. Rawlings, AMC chief. The order gives the offices power to handle procurement and make decisions. A statement of the new functions of the WSPOs is now being drafted.

**Final plan for Defense Dept. reorganization may not be forthcoming** until late in this session of Congress. Reason: Defense Chief Neil McElroy has asked for recommendations of five consultants, all familiar with Defense Dept. operation. Group includes William C. Foster, former deputy Defense Secretary and vice chairman of Gaither Committee; Nelson A. Rockefeller, chairman of earlier Presidential committee for reorganization of Executive Branch; former chairmen of Joint Chiefs Adm. Arthur W. Radford and Gen. Omar Bradley, and current JCS chairman Nathan Twining. Former Assistant Defense Secretary Charles A. Coolidge will be full-time special assistant to McElroy on the reorganization proposal. A unanimous report is not expected from the consultants.

**Radio Corp. of America has been chosen** systems manager for the ballistic missile early warning system. Cost of the "sophisticated" program, which now has Pentagon approval, is estimated at \$721 million. Key to program was the development of high-powered transmitters necessary to obtain detection ranges of 3,000 nautical miles against the ballistic missile. RCA contract is expected to amount to just under \$500 million, with General Electric and Western Electric also sharing in the program.

**New battle is brewing at the Pentagon, involving responsibility for air defense.** In preparation for expected fight, Army and USAF are studying implications of Defense Secretary McElroy's decision giving USAF responsibility for missile detection and Army the job of developing an anti-missile missile—which obviously could knock out manned bombers when developed.

## INDUSTRY At Deadline

### Too much emphasis on missiles, too much red tape in Pentagon, industry leaders tell Senate probers

Top aviation industry officials have urged Senate investigators to help check a drift toward over-reliance on ballistic missiles. Collectively, they have re-phrased long-standing complaints that "arbitrary" rulings of the Renegotiation Board are killing incentive. And, in blunt testimony, they have concluded the Pentagon could get along much better with fewer people.

In essence, these were the indictments against a groaning, overstaffed Pentagon civilian and military weapons team handed the Senate Preparedness Subcommittee. If anything were withheld in a week-long session it was purely out of sympathy for persons caught in the snarl against their will. The system, itself, was soundly rapped.

There were disagreements, to be sure. But on the fundamentals industry concurred: it takes too long and costs too much to produce advanced, complex weapon systems under present Pentagon rules.

What is the solution? Here, industry was both specific and general, but it added up to this:

*Restoration of incentives for the prompt fulfillment of production orders.*

*Peeling away of extra layers of civilian personnel.*

*Authorization for service weapons*

planners in the field to say "yes" and be supported with the funds.

From one of the nation's large prime missile-aircraft manufacturers came a warning. "Manned fighters and bombers and missiles associated with our defenses today are suffering for attention these weeks as the more glamorous ballistic missiles of tomorrow get emphasis in the budget now being considered," said Thomas G. Lanphier, Jr., vice president and assistant to the president of Convair.

He affirmed a standing charge by subcommittee member Stuart Symington (D-Mo.) that the Pentagon has not restored trimmed-back manned aircraft programs.

Meantime, he said, the U.S. should be producing "half again as many" supersonic B-58s as are now planned and production of the F-106 should be similarly stepped up.

Earlier, Air Force Chief of Staff Thomas White urged a speed-up of the B-58 program and disclosed that funds to continue production of the B-52 and KC-135 tanker are exhausted.

Gen. White declared that a request for \$615 million had been rejected by top Defense Dept. officials. No new money to continue production of the aircraft beyond the present order is contained in the budget or in \$1.27-

billion supplemental appropriation requests.

Subcommittee Chairman Lyndon Johnson (D-Tex.) put into the record this schedule for B-58 production: An initial batch of 13, of which the Air Force now has seven; 1958, 17 planes, and 1959, 47 planes.

White observed that the Air Force will need a "high performance manned aircraft for a great many years to come."

Caution against plunging into a race into space at the expense of conventional forces was sounded by Whitney C. Collins, president of Northrop Aircraft. "Missiles, as we know them, have certain limitations," Collins said. "Until we have more knowledge of the potential of missiles for strategic warfare, the manned bomber will be the mainstay of a mixed bomber/missile force in which bombers and missiles will supplement each other."

Collins said that one of the big obstructions to early production of a weapon is the difficulty of getting a firm decision to go ahead with production after a reasonable degree of performance has been demonstrated. He appeared at a closed-door session, but censored testimony was later released.

In a public session, Robert Gross, board chairman of Lockheed Aircraft Corp. urged that the authority for developing a weapon system be retained by the aircraft industry. He also criticized what he called an "alarming lack of firm, clearcut policy of national defense." A long-range policy emanating from the President and endorsed by Congress, he said, must be adopted.

Gross also warned against placing a "reliance on missiles to the point of unbalancing the total pattern of military strength . . ."

Bad administration of the Renegotiation Act is draining the aviation industry's build-up strength, two other industry witnesses charged. Donald Douglas, Sr., chairman of the board, Douglas Aircraft, told Senators "arbitrary" rulings are causing the "attrition of capital resources." In the long run, he said, the drain will weaken industry's ability to do vital "forward thinking" and "forward spending."

The Douglas board chairman flatly told Senators that the firm could push development of the anti-missile missile (Nike-Zeus) abreast of the Thor IRBM with a "go-ahead signal" from the Pentagon.

William M. Allen, president of the Boeing Airplane Co., handed investigators detailed complaints against the Renegotiation Board. A memorandum recommending revisions of the law, prepared two years ago for the House Armed Services Investigating Subcommittee, will be taken under advisement by the Senate unit.

Allen testified that "phase out" of the original B-52 program is under way. He said his firm could start rolling out the B-52G, a greatly modified

### F-100 picks up tow-target with folding boom



NORTH AMERICAN F-100 Super Sabres are now towing high-speed Dart targets for gunnery practice at supersonic speeds. Designed and built by North American, the 10-foot long, chrome moly boom may be quickly installed on the F-100D, and on other F-100 series with minor modifications. Here boom is lowered to 60 degrees for a target pickup. Boom swings up under fuselage when not in use, may be recocked in air.

version, at Seattle by the fall of 1959. If the Air Force issued the order, however, Allen said, Boeing could "increase substantially" production of the bomber and the KC-135 tanker.

Curtiss-Wright president Roy T. Hurley called for an overhaul of Pentagon procurement rules. At the same time, he urged establishment of a special industry procurement committee to work with the Defense Secretary. He recommended that contractors be allowed to conduct their own research and urged an easing on "directed research" by the Pentagon.

A key proposal by Hurley would make funds available directly to procurement authorities in the military departments for prompt use.

A blunt appeal to pare back excess Pentagon personnel was made by Dan A. Kimball, president of Aerojet-General Corp. To increase Pentagon efficiency, he said, officials should lop off from 75% to 90% of its civilian employees.

A reduction of the number of "bodies" was also proposed by Lawrence A. Hyland, vice president and

general manager of Hughes Aircraft Co. Both witnesses criticized the top-heavy structure of the Defense Dept., called for elimination of red tape.

George M. Bunker, chairman of the board and chief executive officer, the Martin Co., warned against centralization of procurement in the Defense Dept. Bunker testified behind closed doors also. In censored testimony, he asserted that the Air Force Titan had reached a development stage in which it should quickly be ordered into production. No orders for a Titan speed-up had been issued at presstime.

J. H. Kindelberger, chairman of the board of North American Aviation, compared the Department of Defense with "a skein of yarn with which the cat has been playing for years. It is badly snarled and loose ends stick out all over. I am sure, however, that it cannot be untangled by wrapping more yarn on the outside."

The NAA chief said that there were too many committees in the Pentagon and they all can say no and stop a project but "very seldom start something."

## Budget Bureau ruling requires contractors to file quarterly financial reports with services

Budget Bureau is still trying to keep control of the cash outflow of the Army, Navy and Air Force.

Under new rules contractors will be required to file quarterly reports with the Army, Navy and Air Force as provided in new standard form (Defense Dept. Form 1097) approved by the Bureau of the Budget Jan. 1.

It has two basic purposes—one for expenditure controls, the other to determine the financial status of contracts. Separate reports are required covering each cost-reimbursement type contract with an uninvolved dollar balance of \$25,000 or over.

In addition, contractors will be required to file a summary report covering all contracts being performed for the Air Force as well as planning programs, and a separate report covering each major AF contract or planning program. The order is not applicable to contracts issued by the Ballistics Missiles Office at Inglewood, Calif. This particular provision is applicable only to the companies and units selected for expenditure control purposes.

In all, the AF has selected a total of 38 contractor units for expenditure controls with administration to be handled at locations listed. These include: Aerojet-General Corp., Sacramento; AC Spark Plug Div., General Motors Corp., Bell Aircraft; Bendix Radio Div., Bendix Aviation Corp.; Boeing Airplane Co. at Seattle and Wichita; Convair Div., General Dynamics Corp., at Fort Worth and San Diego; Curtiss-Wright Corp. at Woodridge and Caldwell, N.J.; Douglas Aircraft at Tulsa and Long Beach; Fairchild Aircraft Div., Fairchild Engine

& Airplane Corp.; Ford Motor Co., Chicago; General Electric, Syracuse, N.Y.; Evendale, Rochester, Boston and Philadelphia; Hughes Aircraft Co., Culver City and Tucson, Ariz.; International Business Machines Corp., Rochester and New York; Lockheed Aircraft Corp., Marietta, Ga., and Burbank, Calif.; The Martin Co., Baltimore, and Denver; McDonnell Aircraft, Ogden; North American Aviation, Inc., Los Angeles; Northrop Aircraft (including Radioplane), Hawthorne, Calif.; Pratt & Whitney Aircraft Div., United Aircraft Corp., East Hartford, Conn.; Radio Corp. of America, Philadelphia; Republic Aviation Corp., Farmingdale, N.Y.; Sperry Gyroscope Div., Great Neck, N.Y., and Western Electric Co., Atlanta and New York.

Army contractor units selected for expenditure control include: Aircooled Motors, Inc., Rochester; AVCO Mfg. Corp., Lycoming Div., Bridgeport and New York; Beech Aircraft Corp., Wichita; Bell Helicopter Corp., Dallas; Cessna Aircraft Corp., St. Louis; Continental Motors, Inc., Detroit; de Havilland Aircraft of Canada, Detroit; General Electric, Boston; Sikorsky Aircraft Div., United Aircraft Corp., Stratford, Conn., and Vertol Aircraft Corp., Philadelphia.

While industry was basically not opposed to providing the services with information required for better fiscal management, real opposition developed to the form. Industry's opposition centered on the requirements for statements in which contractors would have to forecast expenditures and unliquidated commitments.

William Hummel of North Ameri-

## 'Missiles and Rockets' goes weekly in July

American Aviation Publications, Inc. announced that its monthly magazine *Missiles and Rockets* will be published weekly starting in July. Substantial expansion of the editorial and management staff of the magazine is now under way in preparation for the July move.

E. E. Halmos, Jr., for the past 16 years managing editor and senior editor of *Engineering News-Record* magazine, has been named managing editor of *Missiles and Rockets*, effective Feb. 17. He will serve under Erik Bergaust, executive editor.

Halmos was a newspaperman before joining *Engineering News-Record* as managing editor in 1941. Eight years later he became senior editor. *ENR*, a McGraw-Hill publication, was the fifth largest U.S. business paper in 1957 in terms of advertising lineage.

can Aviation, Inc., chairman of the Government Reports Committee of the Aircraft Industries Assn., warned that breakdowns of information required by the form would not only make extensive costly reorganizations of the present accounting systems, but would also jeopardize internal controls of most companies.

H. V. Hannum spoke against the requirements for Radio Corp. of America and the National Security Industrial Assn. He urged that contractor forecasts should be limited to billings only.

"It should not be necessary," Hannum said, "to provide statements of cost and commitments incurred as of the reporting dates. . . . It is not possible to accurately forecast how costs and commitments would be incurred in the same time-phased periods as billings."

## Douglas sales top billion again, but earnings drop

Douglas Aircraft Co. preliminary figures show an indicated net income of \$30,665,000 or \$8.28 per share on sales of \$1,091,366,415 for the fiscal year ended Nov. 30. Comparable previous-year figures were earnings of \$33,202,304, or \$8.96 a share, on sales of \$1,037,515,406.

The board of directors declared a regular quarterly dividend of 50¢ per share, payable Feb. 19 on stock of record Jan. 29. The customary extra dividend of 50¢ was reduced to 25¢ because of the need for conserving funds to meet increasing cash requirements on the DC-8 program and Defense Dept. actions reducing progress payments and cost reimbursements.

Backlog Nov. 30 was \$1,803,620,000, down from the \$2,232,000,000 on Dec. 31, 1956. Latest backlog was 49% military.



## Missiles, manned aircraft get top priority among 1958 AMC objectives set by Rawlings

Missile (space) systems and manned aircraft support will rank No. 1 and No. 2 in priority in Air Materiel Command's day to day operation this year, according to objectives set down by AMC commander Gen. E. W. Rawlings.

Rawlings tabbed the missile effort "first" for emphasis to insure the Air Force has real capability as rapidly as possible. But he stressed that day-to-day priority for national survival remains with manned aircraft and made it clear that AMC must continue progress made during 1957 (1) in making rapid and radical changes in support concepts and (2) in keeping abreast of changes in tactical and strategic concepts.

The AMC chief pinpointed key objectives in other areas with these comments:

**Improved logistics support**—must be pursued vigorously with the mammoth task remaining of intelligent and prudent execution of the tremendous streamlining steps initiated in '57.

**Disposition**—For the past seven years the emphasis has been on efficient acquisition of materials, manpower and facilities and to lessening development-to-production periods. Now new emphasis must be placed on disposition to insure rapid business-like disposal or liquidation of assets no longer required. Disposition plans must be as prompt and effective as build-up or procurement actions.

**Planning**—The goal: more imaginative forecasting. Without this, too many existing procedures, skills, installations, people and prejudices are carried long past the time they are really needed. The structure of AMC is not sacred; neither is its real estate.

**Elimination of non-essentials**—AMC must use only those resources absolutely essential to its task; must be absolutely ruthless in eliminating functions and facilities not contributing directly to the job of maintaining a deterrent capability so preponderant that no one will challenge it.

**Reduction of lead-times**—Positive steps must be taken to assure that pro-

curement lead-times are reduced to the absolute minimum; monitorship of overtime should continue to get maximum benefit, but arbitrary limits should not be used. Procedures must be reviewed continuously to eliminate excessive paperwork and reporting. Contractors' technical know-how should be used to the maximum.

## Link accuses Curtiss-Wright of patent infringement

Link Aviation, Inc. on Jan. 15 filed a patent infringement suit in U.S. district court at Newark, N.J. against Curtiss-Wright Corp., charging C-W with infringing on nine separate patents in construction of flight trainers and simulators.

Link alleges C-W has been infringing on its patents for six years and seeks damages and enjoinder of Curtiss-Wright from manufacture, use, sale, exhibition or display of apparatus which infringes its patents.

The Link action was the second of its type between the two firms. In December 1955 Curtiss-Wright filed a similar suit in U.S. District Court at Binghamton, N.Y. and that case is still pending.

## M-H official forecasts high electronic sales in '58

Sales of electronic equipment for aircraft and missile control should be one of the stronger features of the aviation industry this year, Stephen F. Keating, vice president in charge of Minneapolis-Honeywell Military Products Group, believes.

He estimated that 1957 sales had increased by some \$200 million over the \$1.7 billion in 1956 and predicted an increase of about 15% during 1958—"to perhaps \$2 billion."

Keating estimated that about 23% of the total amount spent for missiles and aircraft during the coming year will go for electronic control equipment. This compares with 20% in 1957 and 17% in 1956.

## BRIEFS

### Manufacturing-military

**Aircraft Industries Assn.** has announced a change in its public relations setup whereby Hill & Knowlton, Inc., will continue as its public relations counsel but its resident staff will shift over to the AIA payroll. Burton E. English moves up from asst. PR director to director, effective Feb. 1. Avery McBee, v.p. of Hill & Knowlton for its Washington operations and PR manager of AIA, will continue to direct the agency's operations.

**Hughes Aircraft Co.** has received a \$21,188,717 contract from Air Force for additional production of airborne control and weapon systems for advanced all-weather jet interceptors. The contract increases total contracted expenditures for the systems to more than \$120 million.

**Rollout** of the Fairchild F-27 prototype has been delayed until late this month. Cause of the delay was cited as "a combination of little things." Indications are that delivery of the first unit to West Coast Airlines will be made in late spring rather than early spring as scheduled.

**Convair** so far has committed or spent some \$50 million on development of the 880 jet transport. Figure includes more than \$10 million in engineering costs to date.

**Temco Aircraft Corp.** is moving its headquarters into a new building at its Garland, Tex. facility. Company has been occupying U.S. Naval Reserve buildings in West Dallas since founding 12 years ago.

**Wright Aeronautical Div.** of Curtiss-Wright Corp. is laying off 1,000 or more employees, mostly production workers.

**Third Jet Age Conference** of Air Force Assn. will be held at Sheraton-Park Hotel, Washington, D.C., Feb. 26-28. Discussions will range from air logistics to space flight.

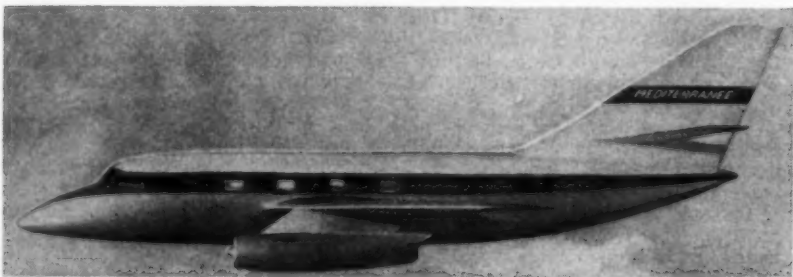
### General aviation

**Delivery** of the first production Piper Comanche was made Jan. 7 to Arkansas Aviation Sales, Little Rock. At present production rate, Piper expects to deliver about 30 Comanches by the end of the month.

**Civil Aeronautics Administration** has approved installation of Tactair's lightweight, pneumatically-operated T-3 Autopilot on all models of the Piper Apache, with no limitations. The 9-lb. T-3, being non-electric, involves no tubes, no power drain and no warm-up, and can be used for takeoff, landing and single-engine operation.

**Nine U.S. lightplane manufacturers** shipped 5,610 utility and executive aircraft during the 11 months ended Nov. 30. Dollar value was \$90,782,000.

## New French executive aircraft to cruise at 560 mph



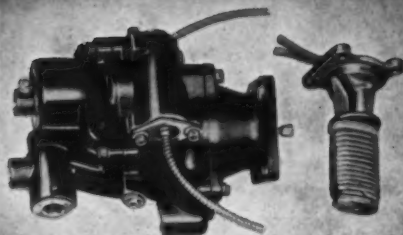
FRANCE'S Dassault company is working on this small jet transport, the Méditerranée. It will carry nine passengers at up to 560 mph over distances of up to 1,600 miles.



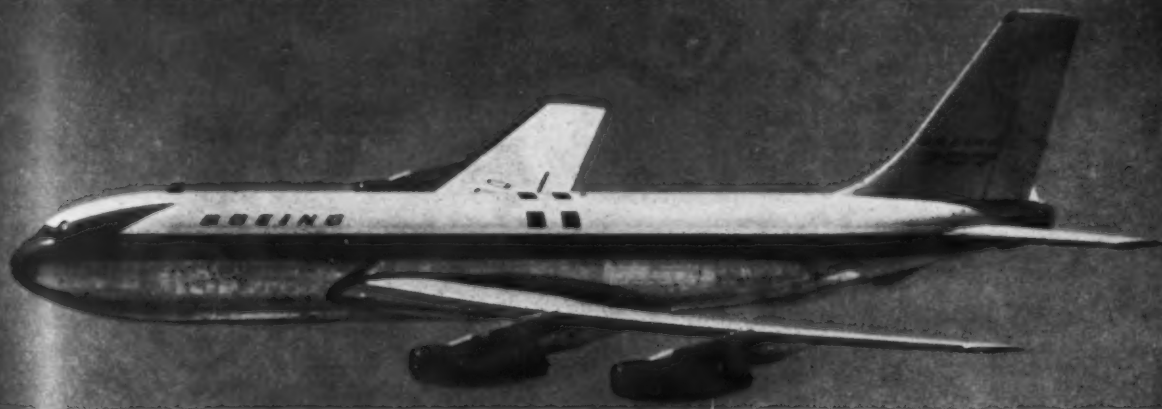
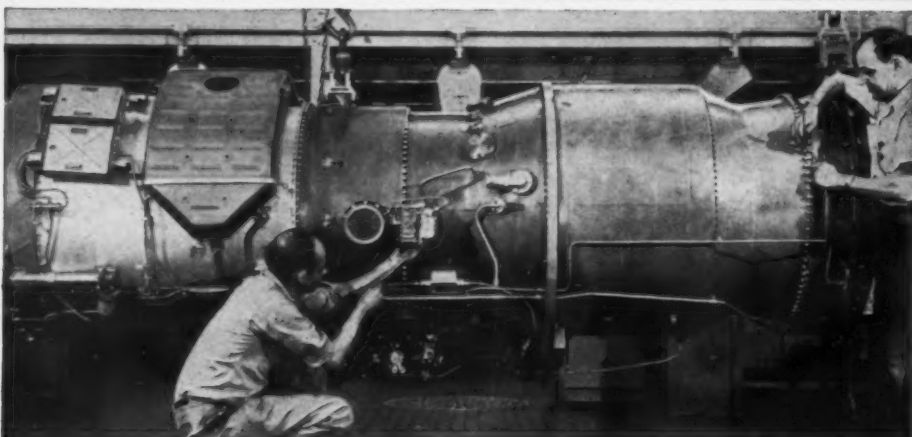
# Holley engine controls selected for JT4 engines on America's first jet airliner



BLEED PISTON ACTUATOR



COMPRESSOR BLEED GOVERNOR



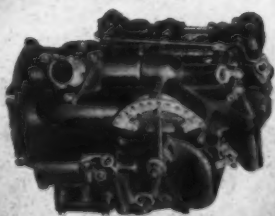
Powered by four JT4 Pratt & Whitney Aircraft engines, the Boeing 707-320 will carry 131 first class passengers from New York non-stop to the Continent in just over six hours! Each of these new engines, commercial counterparts to the J-75 which drives many of America's latest jet fighters, delivers up to 15,000 pounds of thrust. Ability to pack so much added power into a relatively small space is the result of designing engine components which will operate at higher efficiency, require less area and reduce over-all weight.

Holley Carburetor Company, work-

For military applications, the Holley main fuel control (right) is a companion unit to the governor and actuator.

ing closely with Pratt & Whitney Aircraft engineers, carried out this exacting assignment on such vital engine components as the compressor bleed governor, and the bleed

governor actuator. For single and multi-engine military aircraft, the Holley main fuel control is a companion unit to the Holley governor and actuator.



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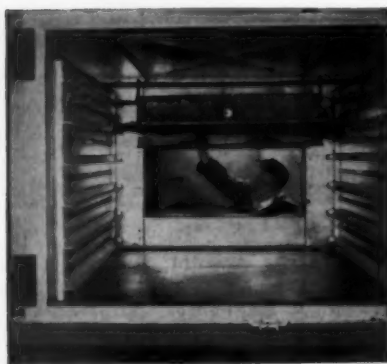
# New B. F. Goodrich laboratory is proving ground for fuel cells



B. F. Goodrich Aviation Products' new Fuel Cell Development and Testing Laboratory at the big BFG Los Angeles plant is the last word in fuel cell research. Here, engineers maintain constant quality checks on cells being produced for many aircraft including the Lockheed 1049, T-33 and F-104, the Boeing B-52, the Douglas F4D and the Northrop T-38. In addition,

fuel cell designs and materials are being developed to meet the requirements of future airplanes still on the drawing boards.

A representative sample of the laboratory's facilities is shown here. Among the specialized types of apparatus are a giant "hot and cold" room, testers for ozone, abrasion and vibration, and many, many more.



**FABRIC TEST.** B. F. Goodrich technician examines new fuel cell fabric that has undergone a heat aging and pressure test in 700°F. oven.



**"SLOSH" TEST.** Steel platform rocks 30,000-lb. load through 30° angle to determine capacity of loaded fuel cell to withstand surge pressures.



**CONTINUAL INSPECTION.** All cell constructions and materials are painstakingly inspected after testing and checked for signs of stress and fatigue.

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## AMERICAN AVIATION

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## Behind the budget . . .

*It satisfies no one, compounds confusion over military spending and signals a new battle between Administration and Congress*

by Elizabeth Oswald

A BATTLE of major proportions is brewing on Capitol Hill over President Eisenhower's Defense Budget request for fiscal 1959. Seeds of the battle were sown during the abortive effort of the Defense Department and the Budget Bureau to clamp tight expenditure ceilings on the Army, Navy and Air Force fiscal 1958 programs.

First signs of the battle to come appeared during the early days of the Johnson (D.-Tex.) Preparedness Subcommittee hearings following the successful launching by Soviet Russia of Sputniks I and II.

The Defense budget request for fiscal 1959 proposes a total of new obligational authority of \$39.145 billion, with an additional \$345 million by way of transfers. Judging by testimony already received on Capitol Hill, it satisfies no one; neither the advocates of more money, nor the advocates of greater economy.

Dissatisfaction already has been noted by Lt. Gen. James M. Gavin, Chief of Army Research. Gen. Thomas White, Air Force Chief of Staff, and high ranking Navy officers have said that insufficient money has been made available for research and development. They also expressed disappointment over the failure to provide money for an additional nuclear-powered aircraft carrier. An increase of 10% in research funds is provided.

Some of the major areas of concern if not outright dissatisfaction include the following:

(1) *The basis for President Eisenhower's request for authority to transfer \$2 billion in appropriated funds between or within the services.* This request, admittedly unprecedented, is seen as a possible club to force greater unification under the undisclosed White House Plan.

(2) *The proposal to provide a new and, as yet, non-existent Advanced Research Projects Agency with \$340 million in new money for work on anti-missile missiles and military application of satellites, rather than to allow the military or the National Advisory Com-*

*Budget money picture in brief*

Here's what the three military services will have for direct obligation—planned to be placed on contract during fiscal 1958 and 1959—shown in millions of dollars.

	Fiscal 1958				Fiscal 1959			
	Total	Army	Navy	Air Force	Total	Army	Navy	Air Force
Operation & Maintenance ..	\$9,323	\$2,852	\$2,496	\$3,975	\$9,322	\$2,723	\$2,489	\$4,109
Major Procurement & Production .	15,251	1,520	4,674	9,052	14,943	1,601	4,643	8,694
Aircraft .....	7,943	125	2,012	5,806	6,832	136	1,889	4,807
Missiles .....	3,257	675	527	2,056	3,780	626	654	2,500
Other* .....	2,402	721	492	1,189	2,774	838	549	1,387
Research & Development .	1,811	457	549	722	2,211	466	641	719

\* Includes electronic and ground handling equipment.

Here's how the three services will pay their way in fiscal 1958 and 1959—shown in millions of dollars.

	Fiscal 1958				Fiscal 1959			
	Total	Army	Navy	Air Force	Total	Army	Navy	Air Force
Operation & Maintenance .	\$9,341	\$2,869	\$2,485	\$3,987	\$9,292	\$2,707	\$2,507	\$4,077
Major Procurement & Production .	13,837	1,357	3,956	8,512	13,753	1,275	4,127	8,349
Aircraft .....	7,519	175	1,935	5,410	6,904	104	1,830	4,970
Missiles .....	2,917	626	321	1,970	3,314	756	446	2,112
Other* .....	2,294	549	613	1,132	2,239	413	559	1,267
Research & Development .	1,801	450	573	730	2,075	460	605	730

\* Includes electronic and ground handling equipment.

NOTE: Major procurement and production totals also include ships, not shown on these tables.

mittee for Aeronautics to get on with the job.

(3) *The failure to provide a promised \$500-million contingency fund to the President to take advantage of technological breakthroughs which may take place.* This amount is not in the budget but is used instead only for planning purposes and would be the subject of later supplemental budget requests.

Under the budget proposal for fiscal 1959, there has been no major shift in the proportions of funds for the Army, Navy and Air Force. Army would receive a total of \$9.036 billion in new money including, for the first

time in five years, \$1.386 billion for major procurement and production to replenish almost exhausted unobligated carryovers; \$471 million for research and development, and \$2.723 billion for maintenance and operations.

Navy would get \$10.72 billion in new funds, including \$4.026 billion for procurement and production, \$641 million for research and development and \$2.489 billion for maintenance and operation.

Air Force would get new obligational authority of \$18.044 billion. This includes \$4.109 billion for operation and maintenance; \$8.035 billion for major procurement and production and



\$719 million for research and development.

Programs for fiscal 1959 would vary somewhat from the requests for new money. It is only by comparison with fiscal 1958 figures, however, that the story comes clear.

In fiscal 1958, President Eisenhower asked for \$38.5 billion in new funds for the Defense Dept. Largely with the concurrence of the Administration, this figure was reduced to \$36.6 billion by Congress, which provided a little more than \$8 billion for the Army, \$10.659 billion for the Navy and \$17.739 billion for the Air Force.

Since Sputnik these figures have been upped sharply by a supplemental budget request of \$1.27 billion largely for Strategic Air Command alert and dispersal; ballistic missile acceleration; ballistic missile detection, and the start of a new space agency which is being viewed with "alarm" by many segments of industry and the military.

By using unobligated carryovers of funds appropriated in previous years and taking advantage of the supplemental budget request, programs to be financed will vary somewhat from the requested new money figures.

As now planned, AF will be reduced from 137 Air Wings at the end of fiscal 1957 to 117 Wings on June 30, 1958 and the Defense Dept. plans an end strength for June 30, 1959 of 105 Wings. A total of 65% of the AF's operating aircraft would be jet by that date, as compared with 62% on June 30, 1958.

The Navy would lose one air carrier group (94 aircraft) dropping from

## On AF's 1959 shopping list

Air Force "shopping list" for Fiscal 1959 based on the current budget request includes:

(1) Initial production buy of B-58 Hustler.

(2) Limited number of T-38s for test.

(3) Limited number of C-133s, to be modified as missile carriers.

(4) Production of the F-106.

No new money is provided in the fiscal 1959 budget for AF buys of the B-52 or T-37.

17 to 16 of which 43% will be jets.

Only the Army is increasing its aviation activities, with firm plans to boost helicopter inventories by 50% before June 30, 1959.

In the total aircraft picture, plans for the National Advisory Committee for Aeronautics play an important role. A supplemental budget request for fiscal 1958 will give NACA an additional \$11.78 billion for salaries and new construction at Langley.

In fiscal 1959, NACA would get new funds totalling \$80.4 million for salaries and expenditures and \$26.22 million for construction and equipment. This compares with \$71 million for salaries and expenses in fiscal 1958 and construction and equipment totalling \$35 million.

These figures are, of course, in sharp contrast with the current proposal providing \$10 million in fiscal

1958 and \$300 million in new funds in fiscal 1959 for the not yet in existence Advanced Research Projects Agency, to be organized in the Office of Secretary of Defense.

## CAA budget nears \$500 million

CAA, with a record \$471.7 million budget request, faces the arduous task of justifying to a missile and satellite-conscious Congress the need for \$204.8 million for airways; \$175 million for new navids; \$20.8 million for safety operations and \$4.3 million for airports over and above \$63 million earmarked for new grants-in-aid.

Despite ATC consciousness in Congress, appropriations hearings for CAA promise to be more exacting than in past. Eisenhower administration's notice that it intends to have airlines and civil aviation pay a large share of airways costs via increased fuel taxes will bring new pressures upon Capitol Hill to insure that CAA is buying the facilities they want and need.

Personnel head-count at CAA rises sharply under proposed budget. If approved, number of permanent jobs would increase to 28,182, a jump of 5,282 over the 22,900 estimate for '58.

## \$35 million sought for Airways Board

Airways Modernization Board, in its first appearance in an Administration budget proposal, is earmarked for \$35 million—a far cry from the \$4.4 million tabbed only two years ago for Air Navigation Development Board before the ANDB job was elevated to its new high stature by Congress last year via legislation establishing AMB.

The \$35 million should survive appropriations hearings intact, although in future years the new agency can look for more searching questions from Capitol Hill on the relationship of its R&D effort to the mounting cost of CAA's navaid facilities program.

## CAB asks \$6.1 million for fiscal 1958

Civil Aeronautics Board's so-called "staffing for the jet age" is emphasized again in the budget in a request which would raise CAB's operating funds some \$700,000.

Increase, which would hike CAB's total to \$6.1 million, is similar to that received for fiscal 1958 but substantially above amounts received in prior years.

Prior to fiscal 1958, CAB's highest appropriation was \$4.6 million, received the previous year. Current year's total is \$5.4 million.

In addition to its operating budget, CAB would get \$40.7 million in fiscal 1959 for subsidy payments to air carriers. This compares with \$37.2 million appropriated for subsidies this year.

## President's legislative program for 1958

President Eisenhower has outlined some of his legislative program in his annual budget message to the Congress. Proposals of interest to Aviation industry include:

(1) Extension of the Renegotiation Act.

(2) Continuation of present tax rates, both corporate and personal.

(3) New legislation to place all government appropriation requests on an accrued expenditure basis, as recommended by the Hoover Commission and now pending in the Congress.

(4) A new 3½-cent jet fuel tax and an increase in the tax on avgas from 2 to 3½ cents per gallon, with plans to increase both taxes at the rate of ¼ cent per year for four years until the tax rate reaches 6½ cents per gallon.

(5) An unspecified increase in patent fees as part of the drive to make services rendered by the federal government self supporting.

(6) A two-year extension of the Defense Production Act.

(7) An indefinite extension of the life of the Small Business Administration with an increase of \$53 million in obligational authority.

(8) Elimination of a Defense Appropriation Act rider which "virtually prohibits normal competitive bidding by other countries on many defense contracts."

(9) Increases in postal rates, as previously recommended, except that the Administration now wants a five-cent rate on all letters other than local mail.

(10) Extension, with broadened authority to reduce tariffs, of the Reciprocal Trade Agreements Act for five years.

(11) Authority to permit the President to transfer a maximum of \$2 billion of funds appropriated to the military services within or between the services. This is labeled as an "historic" request and the possible club to force further unification.

(12) Centering of all nonmilitary defense programs in President's office.

(13) Extension of the Export Control Act.

(14) A temporary increase in the debt ceiling to assure "flexibility" through fiscal 1959.

(15) Authority to veto one or more line items in the Appropriation Acts without vetoing the whole act or acts.



# Proposed boost in aviation fuel tax would cost airlines half a billion

by Eric Bramley

Widespread opposition was developing last week to a Presidential request for a big boost in aviation fuel taxes to pay a substantial part of operating the federal airways.

The requested increases would mean that the airline segment of the industry, for example, would pay more than half a billion dollars in fuel taxes from 1958 through 1962. General aviation, of course, would also be hit.

Ironically, the airlines read in the same paragraph of President Eisenhower's budget message that "we should redouble our efforts to find ways and means to reduce and ultimately eliminate all subsidies for airlines."

The President's surprise request was that Congress set a tax of  $3\frac{1}{2}\epsilon$  a gallon on jet fuel and increase the current tax on avgas from  $2\epsilon$  to  $3\frac{1}{2}\epsilon$ , with increases of  $\frac{3}{4}\epsilon$  a year for four years in both taxes up to  $6\frac{1}{2}\epsilon$  a gallon. Current tax is  $3\epsilon$ , but  $1\epsilon$  is refunded.

The budget message was completely silent on how much the military services should pay for their heavy use of the airways.

About the only portion of the message on which industry could agree was the President's statement that avgas taxes, which now go into the highway trust fund, should be kept in the government's general revenues to help finance the operation of the airways.

The airlines, whose costs have been outrunning their revenues and whose profits have been shrinking, are currently seeking a fare increase. And one trunk, Capital Airlines, has asked that it be returned to a subsidy basis.

In 1957, the airlines paid about \$25 million in fuel taxes. Their profit was \$25 million. If only the first step of the tax plan had been in effect, the avgas tax bill would have been \$43 million, or 72% more than the profit, the Air Transport Assn. said.

It added that the tax proposal would mean that the airlines would pay as follows: 1958, \$49 million; 1959, \$70 million; 1960, \$107 million; 1961, \$141 million; 1962, \$167 million.

An idea of the impact on an individual carrier can be seen from the following: In 1956, American Airlines used 208 million gallons of fuel, on which it paid \$4,160,000 tax at the  $2\epsilon$  rate. At  $3\frac{1}{2}\epsilon$ , the tax would have jumped to \$7,280,000.

Caught in the middle of the higher taxes-subsidy elimination squeeze are the subsidized local service airlines. For example, Allegheny Airlines last year used 5,730,825 gallons, with tax of \$114,616 at  $2\epsilon$  or \$200,578 at  $3\frac{1}{2}\epsilon$ . This boost could mean an increase of 2% to 3% in Allegheny's aircraft

operating expenses. Thus, while the government would be collecting more tax, it would be paying out more subsidy, rather than less.

A general aviation official pointed out that business users, private flyers, etc., used 190 million gallons in a recent year, on which the tax would have been \$3.8 million. At  $3\frac{1}{2}\epsilon$ , it would have been \$6,650,000. Projecting this into 1957, the official estimated the tax at \$7.2 million under the higher rate.

The fact that the President cited specific figures in requesting the increase came as a surprise, even though he has in recent years urged airways user charges. The proposal is said to be the same as that made several months ago by the Commerce Dept., following studies by CAA. The Commerce Dept. plan, never made public, was sent to the Bureau of the Budget. However, expectations were that it would be forwarded to Congress later in a separate report rather than incorporated in the budget message. Next step now will be introduction of a bill covering the tax increases.

ATA president Stuart Tipton said the plan was "unrealistic and does not take into account the priority military use of the airways system."

He declared that "the airlines, of course, would expect to pay their fair share when a federal government policy of levying charges against all users of federally provided facilities is established."

The CAA, which operates the airways, has testified that the military made a 45% use of the airways in 1957, Tipton said. He added: "The clear national defense value of a modern, efficient air traffic system, as well as the extraordinary priority use the military makes of the system, must be taken into account in determining any level of user charges."

tronics industry, unlike other basic industries, has not had the advantage of a bits-and-pieces evolution over many years but has been forced by military pressures. He called for widespread education on reliability problems and greater cooperation and understanding between the military and the industry.

## New rules explain Pentagon inspection policies

New rules have been issued explaining Pentagon policy for government inspection of subcontracted supplies. Defense Dept. Instruction No. 4155.9 limits such inspections to the following situations:

Where test reports, inspections, certificates or other statements of quality are unavailable; inspection is needed to verify test reports; shipment is to be made directly from subcontractor's plant to a DOD using activity; the contractor specification requires that certain inspections be made by a government inspector and that those inspections must be made at the subcontractor's plant.

## Nearly one million earn wages in aviation

Nearly a million workers were earning a living in the aviation industry—manufacturing and operations—at the end of October, according to statistics released by the Dept. of Labor.

A breakdown shows that in the manufacture of aircraft and parts there were 848,000 employees, compared with 853,400 at the end of October 1956. Airline employees numbered 142,000 compared with 135,200 last year.

Despite the fact that the employees were earning from  $8\epsilon$  to  $16\epsilon$  an hour more in 1957, the shorter work week had reduced weekly earnings from the average of \$97.71 in October 1956 to \$95.84.

Average work hours per week dropped to 40.1 at the end of October 1957 from 42.3 a year earlier.

## NAA may have to refund \$5.5 million to U.S.

North American Aviation, Inc., has been notified that some \$14 million of its 1954 income has been considered excessive by the Los Angeles Renegotiation Board.

If the LA regional board is sustained by the parent board in Washington, this would require that NAA refund about \$5.5 million after tax adjustments.

North American has an appeal in the U.S. Tax Court on the Renegotiation Board's ruling for a refund of \$1.3 million, after tax adjustments, on 1953 earnings.

## BUSINESS

### Higher costs plague electronics industry

How to finance the present higher costs of obtaining greater reliability in the face of economic austerity is the major problem facing the electronics industry, says Maj. Gen. F. L. Akenbrandt, USAF (ret.) of Defense Electronic Products Div. of Radio Corporation of America. He spoke at the Fourth National Symposium on Reliability and Quality Control in Washington.

Gen. Akenbrandt said the elec-

## Design report: Grumman's Gulfstream turboprop

by William Beller

HIGH CRUISING SPEED and improved flight safety were the benchmarks for engineers developing Grumman's Model 159 Gulfstream turboprop executive transport. These factors, projected against a background of short-field capabilities, easy maintainability, and provisions for growth in performance, virtually complete the Gulfstream's design picture.

Reportedly 19 of the new transports have been ordered.

Typical performance figures for a Model 159 carrying 12 passengers and 480 lbs. of baggage indicate a 370-mph

000 includes basic navigational equipment but excludes a finished interior. Target date for certification and delivery of first airplane is the end of this year, which is close to the time marked in the company's original timetable. Since flight-testing will not begin until late May, a concentrated program calling for multiple flight-test crews and evaluating staffs is being set up. Total development cost of the 159 will run about \$15 million.

Although the Gulfstream was developed purely as an executive airplane, Grumman engineers are sur-

Aeronautics Administration. Out of these conferences grew a machine of straightforward design, with exceptional maintainability and high structural safety, derived from a "fail-safe" design approach.

An innovation for commercial aircraft is Grumman's use of an integral wing fuel tank with this fail-safe design feature. In the overall picture, the wing is a conventional box beam structure with spars at 12% and 64.5% chord lines. Three sections, a stub center section and inner and outer panels, comprise the wing, whose inner-panel box beam forms the fuel tank.

Theory of the fail-safe design is this: if a primary structural member fails, a catastrophic rupture is avoided by having a second structural member strategically placed to absorb the load. Best example is the Gulfstream's inner-panel box beam, whose upper and lower skins are each made up of four integrally-stiffened machined planks. These planks are lap-joined to one another at three chordwise stations.

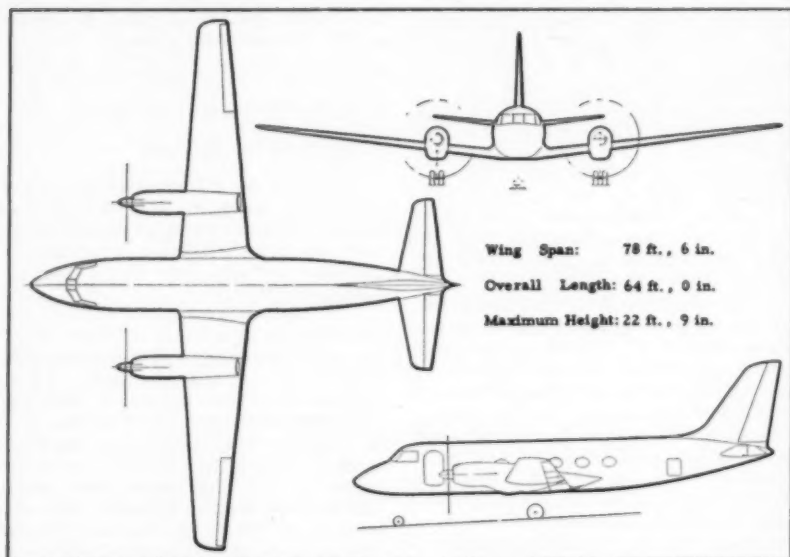
Plank material is 74ST6 aluminum. Inboard upper-surface thickness is 0.80 inches, which tapers to about 0.60 in. at outboard end, except for local pad and splice areas; lower surface tapers from 0.64 to about 0.49 in.

These planks include integral stiffeners, which had been hogged out on a spar miller. Stiffeners run spanwise at two-inch chordwise spacing. Upper ones are one-inch high, and lower ones, ¾ in. Chemically-milled ribs complete this panel's skeleton.

Grumman engineers say that if one plank should fail through fatigue or damage in service, the remaining planks will still maintain 50% of the panel's full strength. For normal flight conditions, this is believed adequate to bring the plane safely down. This is fail-safe design, which characterizes the entire 159. Weight penalty for such design is said to be small, and fully repaid by increased safety.

The tank area was devised to be completely leakproof throughout the airplane's life. Experience for this work was gained from the company's F11F Tiger jet fighter, which had a similar installation. In the military plane, there was only one case of a tank's leaking, and it was repaired in ten minutes.

Prior to assembly, all tank surfaces are coated with buna rubber to prevent corrosion. This procedure differs from the conventional one of coating after assembly, which limits the



THREE-VIEW of Grumman's Model 159 Gulfstream turboprop executive transport.

speed at 25,000 ft. altitude. Under these conditions, range is 1,760 miles plus reserve fuel for a 230-mile diversion and ¾-hour hold. Runway length needed is less than 4,000 feet.

Based on an informal market sales survey made by company executives and a more formal one by Viemeister Associates, Lindenhurst, N.Y., Grumman recently decided to re-enter the commercial aircraft market.

A company spokesman said: "For our type airplane (Gulfstream) there appears to be a good market—there is little doubt about this." He estimated that there is a current need for about 300 such aircraft. He hastened to add, though, that "this is a very rough estimate . . . no survey can be expected to pinpoint the exact figure."

Gulfstream's selling price of \$700,-

veying other possible uses. One that looks encouraging is employment as a high-density aircraft, possibly for feeder-line operation. The executive version was designed for a load of 10 to 12 passengers, but its capability can be extended to 19. Helpful in this respect are the airplane's elliptically-shaped windows—with major axes horizontal for flexible seating arrangements and good visibility.

At design inception, the question of wing placement arose. The market survey quickly answered it when more than 70% of the sampled prospective buyers of the Gulfstream emphatically preferred a low-wing configuration.

Throughout the construction of the 159, Grumman was in continuous consultation with the Air Line Pilots Assn., Flight Safety Foundation and Civil

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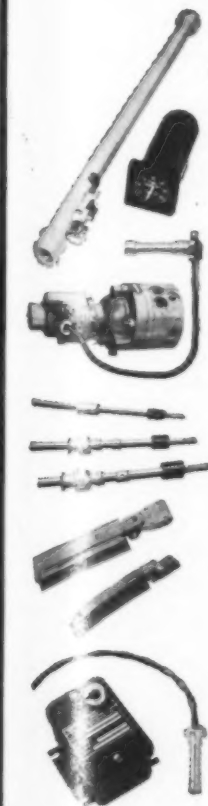
**Cowling and Access Latches:** Heavy duty flush fitting aircraft latches for installation on cowlings and access panels. Two-piece toggle type, available to fit a wide range of structural curvatures; for attachment of plastic radomes, etc.

**Liquid Level Sensing Systems:** Working independently of the fuel gage system, this thermistor sensing system indicates accurately the precise time at which fuel, oil or other liquid goes above or below any designed level. It also automatically stops or starts pumps or valves to transfer the liquid from one tank to another. The system is rugged, has no tubes or moving parts, is light and compact. Operates on military aircraft fuels and oils.

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JANUARY 27, 1958





**TYPICAL WING PLANK** shows hogged out stiffeners, which are located at two-inch chordwise spacings.

rubber's penetration. All faying surfaces are channel-sealed with an uncured sealant. Rivets are held to a minimum, chiefly through use of the integral stiffeners; those rivets that are in the tank area are O-ring sealed.

Wing tanks were designed for easy inspection and repair, which is done externally. If a leak is discovered at a rivet location, the fastener is drilled out and replaced with a Rivnut. Channel seals are quickly reconstituted with a pressure gun aimed through ports on the wing's surfaces. If necessary, the wing's entire labyrinth of channel seals can be replaced in a day's time.

Dual wheels are featured on the landing gear, which is a conventional tricycle type. Pseudraulic shock struts are used. In case of emergency, an air system unlocks the gears for free-fall into a locked landing position. Provision is also included for nose-wheel steering for allsurface operation.

An unusual design feature is that the main landing gear doors can be closed when the gear is down. This minimizes takeoff air drag and is said to be partly responsible for the Gulfstream's short takeoff run.

Two Dart turboprop engines, rated at 2,150 esph each, power the 159. Engines are mounted in nacelles above the wing and are fitted with 11½-foot four-bladed Rotol propellers.

Gulfstream's engine package will be interchangeable with that on Viscount series aircraft. Looking to the future, Grumman expects substantial increases in Dart engine power. Therefore the airframe was designed with this possibility very much in mind, stresswise and designwise. In this way, the Gulfstream developers took out insurance against early obsolescence of their product.

All fuel is stored outboard of the fuselage in integral tanks. Each tank contains two pumps, and all four operate during takeoff to insure full fuel

flow. During flight, one pump per tank operates while the remaining pumps act as emergency standby units. A crossflow system permits either engine to be fed by either tank; there is no fuel transfer system from tank to tank.

To maintain design simplicity, all aerodynamic control surfaces are manually operated and aerodynamically balanced. No unconventional surfaces are used. Airplane trim is provided by mechanically-operated tabs. For take-off and landing, single-slotted fowler flaps give lift augmentation.

**Elevators**—18.62 sq. ft./side, interconnected at fuselage, deflection from 25° up to 15° down, two balance tabs and a tab for longitudinal trim.

**Rudder**—28.9 sq. ft., deflection range  $\pm 20^\circ$ , spring tab used in addition to aerodynamic balancing to reduce hinge moments. Provision for rudder boost is included.

**Ailerons**—18.5 sq. ft./surface, deflection from 20° up to 15° down, spring tabs to reduce hinge moments.

**Flaps**—Fowler type, occupy 57% of span and 30% of chord, driven by hydraulic motor in wing center section and mechanical linkages outboard to flap system. Deflections: take-off, 12½°; approach, 20°; landing, 45°.

The entire circular fuselage, from the cockpit back through the cabin-accessible baggage compartment, is pressurized. In case of sudden decompression, an emergency system supplies oxygen to passengers and crew until airplane descends to a safe altitude.

Main source of air for cabin pressurization, ventilation, heating, defogging and deicing is through an engine-driven Root's blower mounted on the right engine. The air enters by way of a flush inlet on the outboard side of the nacelle. For ground cooling, emergency pressurization and air conditioning, a gas-turbine compressor, independent of engine operation, is carried in the aft section of the fuselage.

Deicing system consists of flush boots with chordwise tubes for the wings, and spanwise tubes for the horizontal and vertical tails. The tubes are fed by engine-compressor bleed air.

The primary electrical system is fed by two 9 kw dc generators, connected in parallel, one generator on each engine. They are designed to carry singly and indefinitely the major electrical loads, a safety feature in the event of an engine failure.

The secondary system is the ac power system, composed of two 1,500 va inverters driven by the dc generators. One inverter powers the airborne weather radar while the second takes care of other fixed-frequency equipment. Should these inverters fail, there is a 1,500 va standby unit plus a battery-fed 250 va emergency unit.

Auxiliary electrical system consists of two 11 kva generators. These provide power for deicing of engines, propellers and cockpit windshield.

Hydraulic power is supplied by two engine-driven variable-volume pumps.

It is a 1,500-psi system, which provides for the normal operation of flaps, landing gear, brakes, door with integral stairway, nose-wheel steering, propeller brakes and windshield wipers.

The auxiliary power system consists of a battery-energized electrically-driven pump. Shuttle valves are used to by-pass the main system for operation of essential units.

Model 159 is designed to house within easy access most modern navigation and communication systems. Grumman engineers are currently studying a plan that would integrate and interconnect the entire electronics set-up, which would result in a lightweight and space-saving installation.

The radar provided for is a Bendix unit with a 22-inch diameter dish. It is a small unit, either C or X wavebands, with ranges up to 150 miles. Autopilot is a Sperry SP-20 unit using two complete compass systems and a radio beam coupler for beam riding.

Summing up the basic design philosophy behind Grumman's new airplane, its engineers feel that the turboprop transport is not an interim solution but rather a basic type of airplane for the business flying market. They contend that such aircraft offer high performance with corresponding safety, operation in a wide range of speeds and altitudes, and will with ease enter existing air-traffic patterns.

## Weight Summary

	Lbs.
<b>Bare Weight Empty</b> (less furnishings) .....	16,932
<b>Furnishings</b>	
Seats, 12 passengers, 40 lb./seat	480
Lavatory, galley, cabinets and wash water .....	170
Trim, curtains & floor covering	208
Sound-proofing .....	104
Partitions .....	262
Food, liquids, magazines, etc.	143
Communication & navigation (570 lbs.), autopilot (160 lbs.) ...	730
	2,097
<b>Total Weight Empty</b> .....	19,029
<b>Operating Items</b>	
2 crewmen .....	340
Unusable fuel .....	75
Oil .....	56
Water injection fluid (13 gals) (600 lb. available space)	100
Crew baggage .....	80
	651
<b>Basic Operating Weight</b> .....	19,680
<b>Payload</b>	
12 passengers at 170 lb. each ..	2,040
Baggage at 40 lb. per passenger	480
	2,520
<b>Zero Fuel Gross Weight</b> .....	22,200
<b>Fuel</b> (1,304 gals) .....	8,800
(10,000-lb. tank available)	
Takeoff gross weight .....	31,000
<b>Total Useful Load</b> .....	11,971 lb.

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971 lb.

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# AMERICAN AVIATION'S

first industry feature theme:

## AERONAUTICAL PURCHASING

- Punch-card purchasing, new management tool ... page 27
- How central purchasing saves \$\$\$ at Douglas ... page 31
- Who buys what in aviation: a directory ..... page 35

## Punch cards streamline purchasing

by Joseph S. Murphy

AIRLINE PURCHASING is at the threshold of the biggest revolution in its history.

Sometime within the next few weeks United Air Lines and Douglas Aircraft Co. will begin the final proving run of a new procurement system that eventually will mechanize every step in the purchasing cycle from the time an order is placed until the bill is paid.

More simply stated, it means substitution of punch-card purchasing for the unwieldy variety of special forms now in use.

It's called IDP (integrated data-processing) and, when finally agreed upon by airlines and major airframe/engine manufacturers, will be issued as Air Transport Assn. Specification No. 200.

To airline managements, the significance of the change is far-reaching. More efficient purchasing operations, better inventory control and reduced parts delivery times are but a few of its promises.

To the manufacturers it offers the Utopian prospect of a single way of doing business with all airline customers.

Looking over the shoulders of UAL and Douglas supply experts during the upcoming trial run will be members of the ATA purchasing/stores IDP subcommittee and the aircraft/engine manufacturers (AEM) committee—the

two groups whose joint effort made the system a reality.

The proving run next month represents little more than the routine of finding and ironing out any last-minute wrinkles before ATA formally adopts the procedures. The major airlines and manufacturers are sold on the new scheme. And all the "heavy" work of agreeing on standard punch-card formats, codes for various transactions, etc. is behind them.

United, for one, is in purchasing by IDP to stay. After a 12-month trial with Douglas using a somewhat different card format, UAL's W. F. Baldwin told AMERICAN AVIATION the savings became so obvious that there was no point in determining exactly how big they really are. Baldwin represents United on the ATA subcommittee and also masterminded the airline side of the UAL-Douglas experiment.

United already has begun using punch cards with the Spec. 200 format. Allowing a short period for conversion to the new system, then another brief span for the trial run, Baldwin expects to get into full swing with IDP for DC-8 provisioning about March 1.

Among the manufacturers, the support for IDP has been so enthusiastic that one airframe producer, Convair, is stressing the availability of Spec. 200 purchasing in its sales approach on the 880 jet transport.

But Convair is no exception. All

the others—Douglas, Boeing, Lockheed, Fairchild, Pratt & Whitney, General Electric, Curtiss-Wright and Allison—are just as strongly behind it. The reason is obvious. It means that suppliers and airlines will be able to do business using one standard system acceptable to all.

For the carriers adopting it, IDP means the elimination or reduction in use of such traditional ordering documents as the quotation request, purchase order, acknowledgment, change order, packing sheet, invoice, sales order, receiving form plus a few others.

In their place will be a series of five IBM punch cards, each color-coded to signal its particular role in the system, and each having its own special format agreed upon by airlines and manufacturers in about 10 major meetings over the past year.

A yellow procurement data card will be supplied to airlines by manufacturers for each active item or part that applies to basic models the airline operates or has on order. It gives all procurement data including part number, description, price, discount and lead-time for the part and will be used as the source of this information when preparing an order for the item.

If there is a price break for quantity order of an item, a red card becomes the standard. A blue procurement data reference card will be used



by manufacturers to replace an existing data card to set up a superseding part number. This card also will inform the airline of the reason for the change.

A manila order card will be originated by the airline for each part being ordered and actually represents a single-item purchase order. This same card, however, also will serve as a quotation request, notice of change, cancellation, desire to expedite, or as a status request to the manufacturer.

A green control card will be used to validate a batch of cards being transmitted between airlines and suppliers and acts as a receipt for the cards it accompanies. If Douglas, for example, can meet the conditions specified by United on a batch of order cards, it will verify the card count and quantity totals and acknowledge the order by signing the control card and dating its receipt.

A salmon-colored packing card transmits specific data which must accompany each shipment. The manufacturer will prepare this card from the original order card and will furnish one with each item shipped.

The big advantage of the new system lies in the fact that it will permit manufacturers and larger airlines to introduce more efficient electronic data-processing equipment into their supply systems without penalizing anyone.

Most carriers and suppliers have such equipment or expect to receive it soon and ATA Spec. 200 is designed primarily for them. However, extreme care has been taken in developing the system to assure its compatibility with customers and manufacturers using conventional equipment.

Even airlines having no tabulating devices will benefit from its introduction because the manufacturer, to facilitate his internal processing, probably will use their conventional purchase order as a source document and guide to record the order in punch-card form.

There is complete flexibility in this area, UAL's Baldwin points out. Cards might even be prepared manually by smaller operators, then punched and interpreted on the supplier's equipment. Some manufacturers already have indicated a willingness to perform this service.

The tremendous contribution IDP offers in streamlining internal processing of orders for the manufacturers

## Architects of IDP

The joint airline-manufacturer effort that produced the IDP plan within the short span of one year was primarily the work of these eight airline supply specialists and 10 manufacturers' representatives, with H. E. "Gene" Brown of Air Transport Assn. coordinating the program.

### For the airlines

American—A. G. Mackey  
Braniff—T. Z. Ennis  
Delta—M. R. McMahon  
Eastern—W. L. Gallmeier  
Ozark—R. Creighton  
Pan American—T. Marcel  
Trans-Canada—R. J. Needham  
United—W. F. Baldwin

### For the manufacturers

Allison—F. P. Fetchman  
Allison—C. D. Southwick  
Boeing—C. E. Kelly  
Boeing—C. R. Swick  
Convair—R. W. Shaffer, Jr.  
Douglas—O. G. Sage  
General Electric—H. D. Kerner  
Lockheed—Alan Hill  
Pratt & Whitney—J. H. Burrill  
Curtiss-Wright—B. J. Lappeus

is bound to reflect itself in reduced lead-times for the future. At least one aircraft manufacturer has told airlines it may mean as much as a 30-day reduction below the 90-to-120-day period generally prevailing under today's system.

Not to be overlooked is the new tool IDP provides to airline manage-

ment. Its adoption will enable carriers to control inventory more effectively than has been possible heretofore. With the inherent ability to sort punch cards on any "field," reports will be available immediately, categorized by vendor, by plane model, by date or by any other breakdown management might require.

As Baldwin expresses it for United, "IDP offers the tremendous possibility of machine-sorting on any punch-card column. Maximum results can be realized from a minimum of manual input.

"Under a manual system, mountains of paper must be sorted and classified daily. Machines can do it much faster, more accurately and do not require a coffee break from this dull repetitive work.

"Our brainiest office help cannot approach the speed, accuracy and efficiency of machines on complex mathematical calculations or even simple ones. Presently everyone and his assistant requests a copy of every purchase document for verification and recording purposes.

"Analyzing this from an IDP standpoint, we find our logic had been faulty for years. Instead of preserving important data we have been losing it in our files. Facts and paper were being relayed continually from person to person, department to department, even city to city.

"Automation can produce necessary copies more quickly and accurately. Under a manual system our reports to management had to be on individual items, but what management requires is correlated data in large groups. Mechanization is the answer here, too."

With this sharp increase in efficiency, IDP obviously means greater output from fewer people and United expects to absorb clerical help by attrition into other phases of IDP, thereby avoiding a reduction in personnel. The one big bonus from the manpower angle, however, is the ability of IDP to mechanize the job of provisioning



**PUNCHING AN ORDER.** Mrs. G. L. Conrad processes order card through IBM 026 key punch as A. L. Kensinger (left) and F. A. Bemel oversee operation.



**PAYING THE BILLS.** United's R. W. Obenhouse and G. H. Reader inspect mechanical production of invoice payment checks on IBM 407.



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34113355U93 101278416003 5342764-12 P4D 00500E40000170539 19083VRL

ORDER NUMBER	PART NUMBER	KEYWORD	QUANTITY ORDERED	UNIT PRICE	DATE	ORDER CARD
101278416003	5342764-12	P4D	00500E40000170539	19083VRL		

UNITED AIRLINES

TYPICAL ORDER CARD to be used by airlines when operating under Spec. 200 system. Five other cards are used in new purchasing system.

for United's new Douglas DC-8 and Boeing 720 jets with about the same number of people it now employs.

Unfortunately, there are still areas of airline purchasing that can't immediately be converted to the punch-card system. This means, at least for the time being, the need for conventional purchase order forms is not eliminated entirely.

Baldwin feels strongly, however, that most carriers will resort to such equipment as Flexowriters, Cardatype or other data-processing equipment to standardize their internal records in punch card or punch tape form.

As it stands now, most airlines plan to phase into IDP through their dealings with larger suppliers first, hence the initial contact via ATA with airframe and engine builders. Next in line, however, are the major accessory producers and the ATA subcommittee expects to meet with this segment of industry this spring, once the UAL-Douglas proving run is completed.

This broadening of the program eventually will support even further advances in mechanization. At the

start, despite the high degree of automation that might exist in an airline or manufacturer's purchasing office, the cards will be airmailed between the customer and supplier.

However, with increasing numbers of airlines and manufacturers participating in the program, carriers look forward to the time when transceivers or other transmitting devices might be installed in key cities throughout the U.S. for joint use by a number of operators or suppliers. With such units, based on present-day capabilities, some 11 cards could be transmitted per minute using telephone techniques and five per minute using telegraph methods.

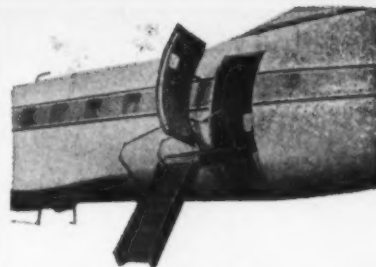
The phase of IDP programming now nearing adoption concerns only the routine day-to-day type purchasing by airlines. There are other areas still to be tackled.

However, the IDP processes now established can still be utilized for initial provisioning and then modified as the ATA specification is developed. Airline technicians are optimistic that the entire Spec. 200 will be available in time for the second round of jet buying.

## How industry is gearing for punched-card purchasing

Full utilization of the benefits of IDP for inventory control calls for computer or modern electronic accounting machines, although neither are requisites for airline purchasing by IDP. Here's how various carriers and manufacturers reported their equipment programs in a survey taken by the ATA subcommittee:

Company	Equipment	Expected delivery	Programmed operation personnel trained
Air France	EAM	16 mos.	2 yrs.
Allison	Adelphi 89		
American	650,705		
Boeing	305 Ramac	After 7/58	after 7/58
Braniff	EAM	1st qtr. '58	when format ready
Convair	650	2nd qtr. '58	mid-58
	EAM (NCR)	1958	
	705		
Delta	650	early '58	early '58
Eastern	705	6/59	6/59
General Electric	EAM & 650	available	when format ready
KLM	705	6/59	6/59
Lockheed	705	2-6/58	2/58
	NCR 304		
Pan American	EAM, 705	6/58	12/58
	& 650		
Pratt & Whitney	EAM	3-6/58	3/58
Trans-Canada	650	12/58	12/58
United	650	operating	mid-58
Wright Aeronautical	EAM	3/58	3/58



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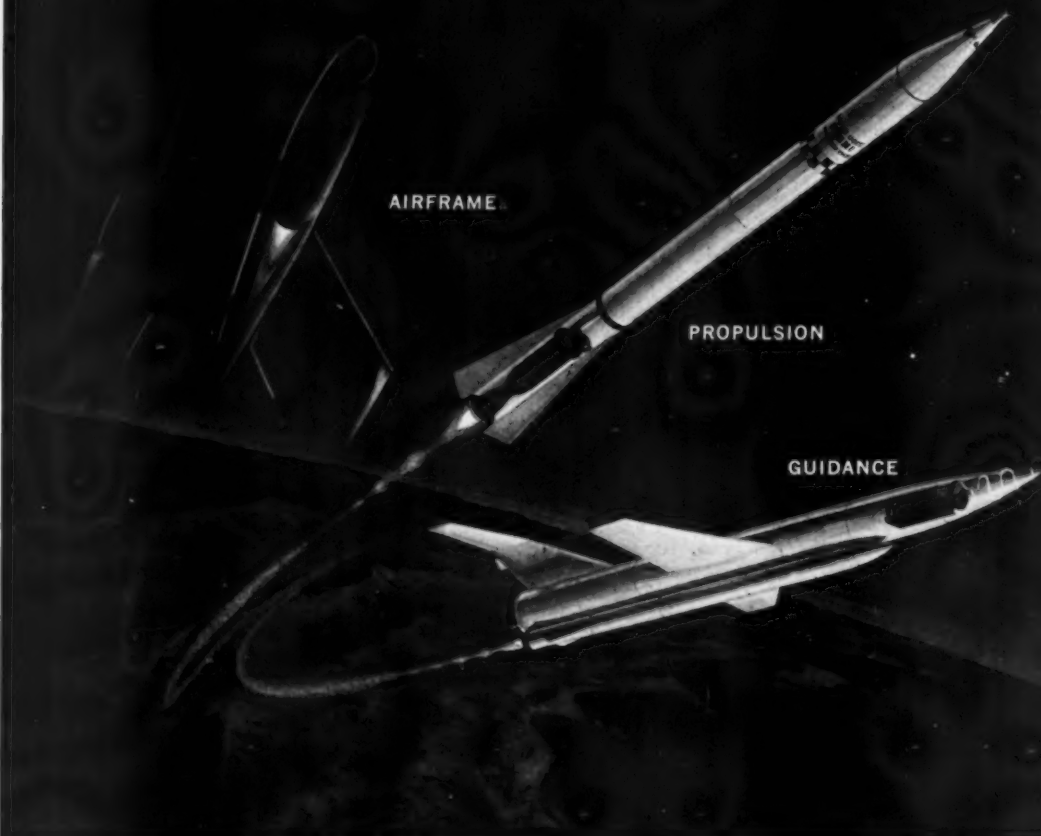
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**PROPULSION**—Manufacture of powerful liquid rocket engines for Army surface-to-surface missiles. Ramjet combustion chambers for Air Force ground-to-air missiles. Major high-temperature components used by various turbojet-powered missiles.

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# How Douglas buys \$1.5 million in materiel a day

*Central purchasing for three divisions uses relatively simple system, keeps buying costs low*

by Fred S. Hunter

THE MATERIEL DEPARTMENT at Douglas Aircraft Co. embraces a wide sphere of related activities and requires approximately 4,000 workers, or about 5.3% of the company's current total employment of 76,000.

But its heart is a compact group of 294 in the consolidated purchasing department in Santa Monica, where the buying volume for the three divisions at Santa Monica, El Segundo and Long Beach runs from \$1 million to \$1.5 million a day.

If Douglas ever should feel the need of a slogan for its purchasing department, "Keep It Simple" might fit very well. This is an operation that follows direct lines all the way.

Its functions, for example, around just two major files. One is the requisition file; the other the purchase order file.

True, other records have to be maintained. These are necessary to cover the complexities of doing business in this modern paper-work age, particularly when a large part of the business is with the military, which, of necessity, is obliged to impose certain rules and regulations for its suppliers to follow. But these are secondary; the two major files suffice for reference for operation of the department.

Aircraft manufacturers don't make a practice of exchanging cost figures, but Douglas believes it has the lowest cost purchasing in the industry by a substantial margin. About five years ago a San Diego college conducted a survey of purchasing methods and found Douglas' purchasing costs—averaging \$1.50 to \$1.60 for purchase order—were less than half the costs of other companies, which averaged \$4 and \$5 per purchase order. Some were even higher.

Since then costs have gone up. Buyers and expeditors and secretaries draw bigger pay checks from wage inflation. Advancements in the art have upped costs, too. The complexities of systems add to the complexities of buying in such fields as radar, telemetry, electronics.

Today, the purchasing cost at Douglas has advanced to \$3 per purchase order. But the company's low cost ratio, Douglas buyers aver, continues to be maintained and perhaps even improved.

Douglas submits another illustration of the proficiency of a central buying department for the production of aircraft and missiles. It has not had a line stoppage in the 16 years since

the consolidated office was organized.

Douglas consolidated the purchasing activities for its three divisions in Southern California into one centralized department of Feb. 7, 1942. A few months later it reached into its engineering department and picked the latter's chief draftsman, D. J. Bosio, to head it up. A. C. Raithel, who had



D. J. BOSIO  
Director of Materiel

come into the company the year before with a background of experience with other companies, including American Telephone & Telegraph, became his assistant.

Now, nearly 16 years later, the scope of their responsibilities has been extended considerably, but they still comprise the management team at the helm of the materiel department; Bosio as director, Raithel as assistant director. It's symbolic of the character of the Douglas materiel organization that they jointly occupy the same office.

Additional evidence of the solid foundation on which the central purchasing department is established is the fact that most of its buyers have come up through the ranks, and now have had 10 years or more buying experience. W. G. Doran, who is purchasing manager and reports directly to Bosio, has been with Douglas for many years.

Worthy of note are the department's physical characteristics. Located in the factory complex at Santa Monica, the buyers occupy desks in a large open room. Overhead signs spell out the name of each buyer in large letters. Once a salesman has cleared the reception lobby, he merely climbs a

set of steps into the buyers' room and looks for the sign he wants. He can't miss his man. No escort is required.

In this unpretentious setting, all procurement for the Douglas Southern California plants takes place, except for outside manufacturing, which is handled at the divisional level. This activity is mostly the procurement of time from outside sources for work which could be done within the plant but is subcontracted out for one reason or another. Where Douglas provides the materials for this outside manufacturing, they are ordered by the purchasing department.

Among the more important advantages of a centralized buying organization is source protection. Placing from 7,000 to 9,000 purchase orders and 80 to 100 contracts a week, Douglas buyers are procuring approximately 100,000 individual items and services and dealing with approximately 10,000 sources of supply.

In numerous instances, same sources supply more than one division of the company. The nature of the aircraft manufacturing industry makes it fraught with such hazards as cancellations, cutbacks, stretchouts and other production changes, all of which represent a related hazard to suppliers. If Douglas were buying on an individual basis, a divisional buyer might lose touch with a highly desirable source as a result of a cutback within the division. By buying out of a consolidated organization, he continues his contacts through orders he may negotiate for other divisions.

To the vendor or supplier many advantages accrue. A supplier's representative, for example, has only one geographical location, one unit, one purchasing element, often only one individual to contact, to consider in resolving any problems, or supplying information and prices on an item required for one or all three company plants.

Procedures, paper work and other requirements are uniform for a source of supply for all three plants. Decisions on solving critical shortages that may apply to all three plants can be made by one centralized unit or individual having knowledge of separate plant conditions, related schedules, etc. Fewer contracts with vendors are required, and sources of supply are not exposed to individual plant inquiries or pressures.

The single purchasing department for the three west coast plants affords the Douglas buyer quantitative buys and







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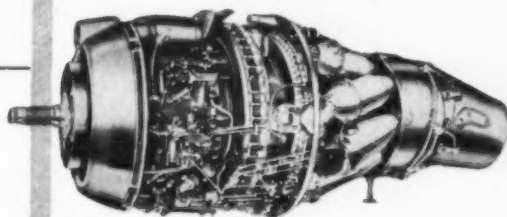
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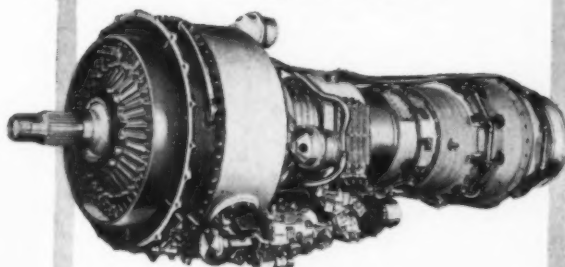
## DART PROP-JET

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Aviation Traders Accountant  
Armstrong Whitworth 650 • Handley Page Herald  
and Grumman Gulfstream



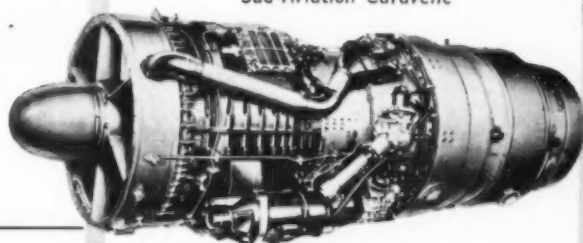
## TYNE PROP-JET

Vickers Vanguard  
Armstrong Whitworth 651



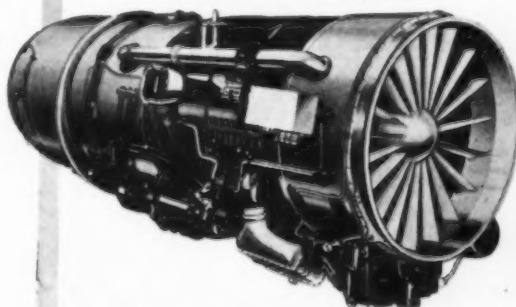
## AVON TURBO JET

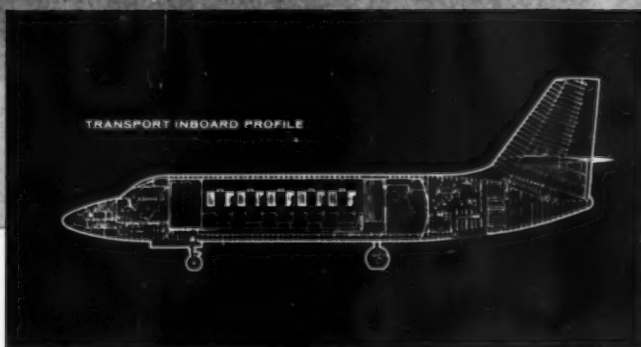
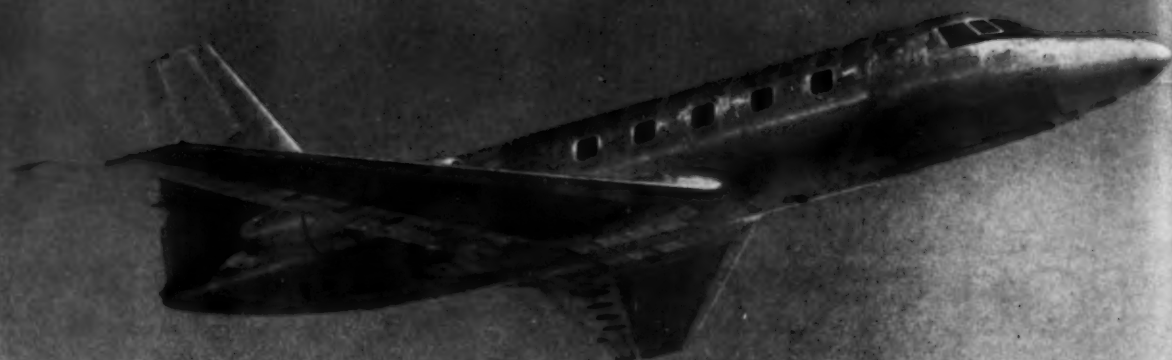
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**VARs**  
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**KENDRICK**  
*Western*

## Who buys what in aviation

### AMONG THE AIRLINES

**ALASKA AIRLINES, INC.:** Robert W. Foss, supt. of purchasing & stores.

**PURCHASING OFFICES:** Paine Field, Everett, Wash., Phone: Highland 1131, Seattle Exchange: SNecca 8010, ext. 61.

**BUYER DIRECTORY:** airframe & engine parts & accessories: **A. W. Anderson**; raw materials, hardware, misc. supplies & equip.: **C. L. Skevig**.

**ALLEGHENY AIRLINES, INC.:** R. C. Gudikunst, dir. of supply.

**PURCHASING OFFICES:** Hangar No. 12, Washington National Airport, Washington 1, D. C., Phone: Sterling 3-4500.

**BUYER DIRECTORY:** airframe, propeller & engine parts, fuels & oils, complete units & equip., service contracts: **R. C. Gudikunst**; accessory, electrical, instrument & communication parts, shop & ramp supplies: **G. J. Lostetter**.

**AMERICAN AIRLINES, INC.:** G. J. Brandewiede,



**COURTNEY**  
*S&W*



**MASK**  
*Slick*

v.p. purchasing & stores (Park Ave.): **R. A. Goebel**, asst. v.p. purchasing & stores (Park Ave.); **B. W. Trussell**, dir.-warranty contracts (LaGuardia); **J. R. Carroll**, dir.-purchasing div. (LaGuardia); **G. R. Dunn**, field purchasing rep. (LaGuardia); **E. C. Holvedt**, mgr.-purchasing (LaGuardia); **E. J. Murray**, dir., purchasing & stores (Tulsa); **T. B. Robertson**, mgr.-purchasing (Tulsa). **PURCHASING OFFICES:** New York, N.Y.: 100 Park Ave.; Phone: MU 3-9000; Flushing, M. Y.: LaGuardia Field Station, Flushing 71, Phone: HA 6-8800; Oklahoma: Tulsa maintenance & Overhaul Depot; Phone: Temple 8-3361.

**BUYER DIRECTORY:** LaGuardia: fuel, oil & lubricants: **A. F. Fontanelli**; carrier service contracts: **A. M. Firestone**; publications & mail services: **F. K. Purinton**; commissary, communications, janitorial equip. & supplies: **J. H. Bergstrom**; office machines & equipment: **F. J. Young**; ground support equip.,

heavy machinery & local requirements of metals: **J. J. Gifford**. Tulsa: engines & accessories, instruments & related spare parts: **F. L. Doyle**; airframe accessories & spare parts: **M. L. Chapman**; airframe accessories, engines & accessories, instruments for jet turbine fleet: **W. W. Flottman**; AN hardware, furniture, stationery, misc. electrical equip. & parts, & requirements of AA de Mexico: **R. G. John**; local raw metals & outside fabrication requirements: **P. W. Kendall**; warranty replacement: **C. L. Turner**; contracts for outside services required locally, warranty & service policy claims: **H. J. Fox**.

**BONANZA AIR LINES, INC.:** Earle E. Hall, supt. of purchasing & stores; **Thomas A. Mulroy**, asst. supt. of purchasing & stores.

**PURCHASING OFFICE:** P. O. Box 391, McCarren Field, Las Vegas, Nev.; Phone: DUDley 4-6600.

**BRANIFF AIRWAYS, INC.:** Horace Bolding, v.p.-purchasing & stores; **Charlie M. Mathews**, system purchasing agent (Dallas).

**PURCHASING OFFICES:** Dallas: Braniff Airways Bldg., Exchange Park, Dallas 35, Tex., Phone: Fleetwood 2-1721. Minneapolis: Wold-Chamberlain Field, Minneapolis, Minn.

**BUYER DIRECTORY:** Dallas: Menasco landing gear parts for Convair 340 & 440. Walter Kidde fire extinguisher spare parts, Pratt & Whitney engine parts for R-2800 on DC-6 & Convair, airframe parts, radio & equip., Cleveland landing gear for Douglas aircraft: **Gerald Gregg**; raw materials, automotive equip., machine tools, shop supplies, batteries, tires & tubes, hand tools: **Embroe D. Buntin**; Curtiss-Wright engine parts, C-46, L-049 aircraft parts & misc. items, B. F. Goodrich brakes, boots etc., oxygen, chemicals, paints: **Joe B. Fleming**; propellers & parts, instruments, electrical equip., valves, gauges, windshield parts, commissary, office equip. & supplies: **Ruth Sidles**; hardware, electrical items, misc. aircraft parts, instruments & parts: **Russell W. Brown**. Minneapolis: Pratt & Whitney engine parts, passenger service supplies, hangar, shop & ramp equipment, paints, tires & tubes, chemicals, bearings: **Warren Steller**; DC-3 airframe materials, hardware, radio, electronics, rugs & fabrics: **Homer McClure**.

**CAPITAL AIRLINES, INC.:** George M. Porter, dir. of procurement & supply; **Richard H. Schwank**, asst. dir.

**PURCHASING OFFICES:** Washington National Airport, Washington 1, D. C., Phone: REpublic 7-6830.

**BUYER DIRECTORY:** shop & ground equip., electronics, stationery, office supplies, printing & commissary supplies: **W. Howard Iliff**; aircraft parts & equip., metals: **Josephine K. Cousins**; shop supplies, tools & hardware, instruments &

accessories & parts, chemicals & cleaners: **Joseph M. Dean**; engine parts, piston & jet, propellers & parts, piston & jet: **Harriet M. Lorenzen**.

**CHICAGO HELICOPTER AIRWAYS, INC.:** B. J. Daly, chief purchasing agent, aircraft parts & supplies.

**PURCHASING OFFICE:** 5240 West 63rd St., Chicago 38, Ill., Phone: REliance 5-0200.

**CONTINENTAL AIR LINES, INC.:** Richard G. Schorling, dir. purchasing & property.

**PURCHASING OFFICES:** Denver: Stapleton Airfield, Denver, Colo., Phone: DEXter 3-1522. Los Angeles: 7300 Maintenance Rd., Los Angeles, Calif., Phone: Oregon 8-3949.

**BUYER DIRECTORY:** Denver: aircraft parts & accessories: **W. F. Vanlandingham**; metals, hardware, accessories: **R. E. Huber**; office supplies/equip.: **H. E. Fetterhoff**; purchase of all DC-7 equip.: **O. N. Lipscomb** (Los Angeles).

**DELTA AIR LINES, INC.:** K. T. Wilson, purchasing agent.



**MCNAMARA**  
*New York Airways*



**DALY**  
*Chi. Helicopter Airways*

**PURCHASING OFFICES:** Atlanta Airport, Atlanta, Ga., Phone: POplar 1-6621, ext. 331.

**BUYER DIRECTORY:** hardware, hangar & shop supplies, automotive parts, tools, propellers & parts: **J. D. Dunn**; airframe & landing gear parts for Douglas aircraft, lubricants, commissary supplies: **A. S. Gordon**; materials, radio & radar equipment, instruments, carburetor & distributor components: **W. H. Hobbs**; engines & parts, shop & ramp equip., aircraft wheels & brakes, automotive equip.: **R. G. Johnson**; misc. rubber stock, plastic & fiber stock, sealants, office supplies/equip., uniforms: **W. C. McCullers**; Convair & C-46 airframe parts, Convair landing gear parts, electrical hardware, paints, chemical supplies: **J. P. Scholze**.

**EASTERN AIR LINES, INC.:** Levin J. McLeod, gen. purchasing agent; **J. D. Conley, Jr.**, district



**SCHORLING**  
*Continental*



**BAYLESS**  
*Hawaiian*



**IRISH**  
*Mohawk*



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*N. Central*



**SUTTLES**  
*Southern*



**SLATER**  
*Southwest*



**LEATHERWOOD**  
*Trans Texas*

purchasing agent; R. E. Lane, district purchasing agent (New York).

**PURCHASING OFFICES:** Miami: International Airport, Miami 48, Fla., Phone: Newton 4-3571. New York: 10 Rockefeller Plaza, New York 20, N. Y., Phone: Circle 6-3300.

**BUYER DIRECTORY:** Miami: ground & office equip.: R. A. Latta; building, maintenance & office supplies, construction: W. G. Griffith; all airframe purchases: E. H. Hoskins; engine accessory purchases: J. H. Millar; radio, instruments, electrical equip., passenger & commissary supplies: W. H. DeVane.

**ELLIS AIR LINES:** Gilbert E. Lorenz, dir., purchasing agent; Valerie C. Horn, asst. purchasing agent.

**PURCHASING OFFICE:** Box 1059, Ketchikan, Alaska, Phone: 2145.

**FRONTIER AIRLINES, INC.:** Barney Foster, chief purchasing agent; William Hamilton, asst. purchasing agent.

**PURCHASING OFFICE:** Hangar No. 5, Stapleton Airfield, Denver, Colo., Phone: Dudley 8-4201, ext. 80.

**HAWAIIAN AIRLINES LTD.:** David L. Grubb, director, materiel & communications; Barbara Bayless, purchasing agent.

**PURCHASING OFFICE:** Honolulu International Airport, Honolulu 17, T. H., Phone: 85911.

**LAKE CENTRAL AIRLINES, INC.:** C. L. Desterbecque, dir. of purchasing; V. T. Salazar, asst. purchasing agent.

**PURCHASING OFFICE:** Weir Cook Airport, Indianapolis 44, Ind., Phone: CHapel 4-2433.

**MOHAWK AIRLINES, INC.:** Glenn W. Irish, dir. of purchasing.

**PURCHASING OFFICE:** Oneida County Airport, Utica, N. Y., Phone: 5-7511.

**NEW YORK AIRWAYS, INC.:** Gerard E. McNamara, mgr. of supply & procurement.

**PURCHASING OFFICE:** P. O. Box 426, LaGuardia Airport Station, Flushing 71, N. Y., Phone: Defender 5-6600.

**BUYER DIRECTORY:** technical aircraft materials: Rolf Gsell.

**NORTH CENTRAL AIRLINES, INC.:** Gordon E. Bullis, procurement mgr.

**PURCHASING OFFICES:** 6355 34th Avenue South, Minneapolis, Minn., Phone: Parkway 1-4421.

**BUYER DIRECTORY:** engines & accessories, propellers, radio equip., aircraft systems & parts: Gordon E. Bullis; ramp, shop, office, passenger service equip., printing & metals: Milton V. Anderson; airframe parts, outside repairs & fabrication, radio parts, uniforms & supplies, hardware, electrical supplies: Vernon W. Georgia.

**NORTHWEST AIRLINES, INC.:** John D. Vars, purchasing agent.

**PURCHASING OFFICES:** Holman Field, St. Paul, Minn., Phone: Midway 6-2966.

**BUYER DIRECTORY:** Douglas & Boeing aircraft spare parts & accessories, uniforms: H. H. Putnam; Pratt & Whitney engines & spare parts, Hamilton Standard propeller assemblies & spare parts, wheels, brakes, de-icers & fuel tanks: J. A. Simpson; shop & hangar maintenance supplies, lumber, tools, ground equip., paint, clothing: H. H. Schomaker; office equip./supplies, ground equip., passenger & cabin service supplies, printing; tapes & abrasives: R. M. Schroeder; Curtiss-Wright engines & spare parts, aircraft & engine accessories, tools, raw stock: Leo Dannecker; radio, electrical items, passenger and cabin service supplies, first aid equip., staff houses' food, furniture & equip.: K. L. Edquist; aircraft accessories, electrical items, aircraft & maintenance hardware, outside fabrication: R. W. Glanville.

**OZARK AIR LINES, INC.:** Rex Creighton, dir. of purchases.

**PURCHASING OFFICES:** Box 6007, Lambert Field, St. Louis 21, Mo., Phone: Pershing 1-0990.

**BUYER DIRECTORY:** hardware, metals: R. E. Kuhlman; electronics, accessories: L. G. Hinderfelder.

**PACIFIC NORTHERN AIRLINES, INC.:** Walter R. Anderson, purchasing agent; Donald G. Brown, asst. purchasing agent.

**PURCHASING OFFICE:** P. O. Box 43, Boeing Field, Seattle 8, Washington, Phone: MOhawk 6020, ext. 3.

**PAN AMERICAN-GRACE AIRWAYS, INC.:** William W. Pressley, purchasing agent.

**PURCHASING OFFICE:** P. O. Box 817, Miami Int'l. Airport, Miami, Fla., Phone: NE 4-5444.

**PIEDMONT AIRLINES:** W. W. Barber, gen. purchasing agent.

**PURCHASING OFFICE:** Smith Reynolds Airport, Winston-Salem, N. C., Phone: Park 5-0511.

**REEVE ALEUTIAN AIRWAYS, INC.:** Robert L. Hanson, gen. purchasing agent; Nathan H. Newman, asst. purchasing agent.

**PURCHASING OFFICE:** 2424 East Fifth Ave., Anchorage, Alaska, Phone: 4742.

**RIDDLE AIRLINES, INC.:** Burl McCorkle, gen. purchasing agent.

**PURCHASING OFFICE:** P. O. Box 535, International Airport, Miami 48, Fla., Phone: TUXedo 7-2651.

**SEABOARD & WESTERN AIRLINES, INC.:** Joseph Courtney, dir. of supply & purchasing; Dominic Mancuso, supv. of purchasing, general.

**PURCHASING OFFICES:** Hangar No. 9, New York International Airport, Jamaica 30, N. Y., Phone: OLYMPIA 6-5880.

**BUYER DIRECTORY:** hardware, misc. supplies: Vincent Lopez; aircraft parts: Patrick Powers.

**SLICK AIRWAYS, INC.:** J. M. Mask, dir. of purchasing; H. A. Seyfert, supv. of stores (Calif.); Felix Hulinker, senior buyer (Calif.); R. L. Howe, supv. of stores (Tex.).

**PURCHASING OFFICES:** 3415 Cedar Springs Rd., Dallas 19, Tex., Phone: Lakeside 6-7676; 3000 N. Clybourn, Burbank, Calif., Phone: Stanley 7-2131; Box 6568, San Antonio, Tex., Phone: TA 2-3303.

**SOUTHERN AIRWAYS, INC.:** R. C. Suttles, Jr., purchasing agent.

**PURCHASING OFFICES:** Atlanta Airport, Atlanta, Ga., Phone: POPlar 6-5321, ext. 274.

**BUYER DIRECTORY:** airframe parts, electronics, accessories: Dave T. Cannon; hardware, tires, chemicals, metals: Charlie Chapman.

**SOUTHWEST AIRWAYS CO.:** L. W. Slater, purchasing agent.

**PURCHASING OFFICE:** San Francisco International Airport, San Francisco 28, Calif., Phone: PLaza 5-8885.

**TRANS-PACIFIC AIRLINES LTD.:** Clarence D. Young, treasurer-controller.

**PURCHASING OFFICES:** 36 So. King St., P. O. Box 3769, Honolulu, T. H., Phone: 64471. Supply Dept., TPA Hangar, Honolulu Airport, Honolulu, T. H., Phone: 837315.

**BUYER DIRECTORY:** communication equip.: Merlyn Hellerstedt; radio & aircraft parts, materials & supplies: Harold Dang.

**TRANS-TEXAS AIRWAYS:** W. C. Leatherwood, dir. of purchasing.

**PURCHASING OFFICES:** International Airport, Houston 17, Tex., Phone: Mission 5-3381.

**BUYER DIRECTORY:** hardware, metals, electrical, hydraulic, stationary: R. L. Cate.

**TRANS WORLD AIRLINES, INC.:** Fred G. Betts, v.p.-purchasing; W. F. Griffith, dir. of purchasing; Everett Monsees, asst. dir. of purchasing; C. F. Chapman, mgr.-purchasing (Atlantic Region).

**PURCHASING OFFICES:** Mid-Continent International Airport, Kansas City, Mo., Phone: SH 1-1120.

**Atlantic Region Purchasing, International Airport, Jamaica 30, N. Y., Phone: OLYMPIA 6-5200.**

**BUYER DIRECTORY:** fuel administration, avgas, lubricants, deicing fluids, grinding compounds: Mills Chastain; special projects: Russell J. Smedley; Accessories Section: John W. Huffman (mgr.); hydraulics, hardware, electrical & electro-mechanical items, survival equipment, landing gear accessories, furnishings, spark plugs, mechanical equip.: Robert W. Kelley, Chas. A. Mason; Airframe Section: J. S. Nelson (mgr.); all airframe items, basic aircraft parts, superchargers, compressors & air conditioners: Wallace D. Warren, Lorin K. Stewart; Electronics Section: Ray A. Moore (mgr.); electrical equip., radio, radar & parts, electrical instruments: Raymond C. Radulits; Misc. Section: Edward G. Henson (mgr.); commissary items, hardware, raw materials, tools, uniforms, plastics, fabrics & materials: Henry L. Morse; Power Plant Section: Len M. Schreiber (mgr.); engines & parts, propellers & parts, hardware: C. H. Aldrick; Office Equip./Supplies Section: Jack L. Watson (mgr.); Howard L. Roberts (buyer); Sub-Contract & Capital Equip. Section: Harry L. Dyer (mgr.) hangar & ramp equip., all ground equip., electrical & air tools, signs, galleys, all items purchased to TWA specs.: William R. Winders.

**UNITED AIR LINES, INC.:** D. V. O'Leary, dir. of purchasing.

**PURCHASING OFFICES:** Purchasing Dept., San Francisco International Airport, San Francisco,

Calif., Phone: Juno 8-2424. Purchasing Dept., 5959 South Cicero Ave., Chicago 38, Ill., Phone: PORTsmouth 7-3300.

**BUYER DIRECTORY:** San Francisco: Airframe items, hardware, fabrics, metals, rubber, chemicals, paints, avgas, lubricants, tools, ramp & ground equip.: J. S. MacSwain, J. C. Lawless, N. R. McFarland, D. R. Lindsay; engines & accessories, heating & ventilating, jet fuel controls: F. H. Griggs, K. E. Lee; radio & electrical equip., photographic items, medical & fire extinguishing equip., ground electrical spare parts, dining service equip. & office supplies: R. D. Gottschalk, R. B. Ropes; propellers, instruments, carburetors, welding & soldering equip., shipping containers: O. W. Johnson.

**Chicago:** Printing, advertising, office & accounting equip., service contracts: J. P. Levin, E. A. Tomczak; furnishings, dining service supplies, office furniture: N. L. Rossman, E. D. Flanagan; ramp & hangar equip., lumber, electronic equip., photographic equip., chemicals, refrigeration & air conditioning, building maintenance supplies & equip., raw stock, fire fighting equipment, signs: L. C. Evans; uniforms, publications binders, name plates: R. C. Conahan, E. A. Tomczak.

**WEST COAST AIRLINES, INC.:** Morris Johnson, purchasing agent.

**PURCHASING OFFICE:** Georgetown Station, Seattle 8, Washington, Phone: Lander 6350.

**WESTERN AIR LINES, INC.:** Kenneth W. Kendrick, dir. of purchasing.

**PURCHASING OFFICES:** 6060 Avion Drive, Los Angeles 45, Calif., Phone: ORegon 8-2531.

**BUYER DIRECTORY:** hardware & metals: H. E. Ford, H. Huggins; electronics, accessories, airframe spares: Lloyd Riddle; uniforms: M. Thorquist; engine overhaul spares: M. Clark; printed forms, subscriptions: M. Carney.

## AIRCRAFT MANUFACTURERS

**AERO DESIGN & ENGINEERING CO.:** John W. Peoples, Jr., purchasing supv.; S. V. Daniels, asst. purchasing supv.

**PURCHASING OFFICES:** P. O. Box 118, Bethany, Okla., Phone: Whitney 9-5670.

**BUYER DIRECTORY:** raw materials: C. L. Tyson; electronics: J. D. Baughman; hardware: Dick Lovelady; maintenance: Vern Justus.

**BEECH AIRCRAFT CORP.:** L. E. Bowery, mgr. materials; W. R. Sullivan, asst. mgr.; L. E. Huffman, general supv.; H. W. Deers and V. M. Melick, supvs.-purchasing; E. Adamek and E. B. Clark, sr. buyers.

**PURCHASING OFFICES:** Procurement Dept., Wichita 1, Kans., Phone: MUrray 3-4681.

**BUYER DIRECTORY:** aluminum & magnesium: H. H. Unruh; engines, propellers, carburetors, governors: R. L. Mauk; controls, mufflers, moulding, formed glass, cable: L. L. Hellar; castings, forgings: F. P. Butler; instruments, tools, furnishings, drive shafts: R. C. McCafferty; electrical items: E. W. Foulk; hardware: W. G. Konecny; air bottles, air conditioners, spark plugs, valves, filters: C. E. Swierczinsky; material, paints, fuel, lubricants: J. M. Sparks; metals: E. A. Rudy; safety equip., batteries, heaters, furnishings, electrical system accessories: R. F. Hulvey; placards, springs, controls, panels: W. F. Brandom; steel tubing, wiring plastic, plywood, rubber: G. E. McMahon; castings, forgings: G. E. O'Grady; landing gear items, de-icing equip., fuel cells & fittings: C. G. McDonald; electrical items, fire, oxygen, electronic equip.: L. L. Shirk; clamps, fittings, turnbuckles: K. M. Overholt; radios: L. E. Faldix.

**BELL AIRCRAFT CORP.:** Maurice J. Coughlin, dir.-procurement.

**PURCHASING OFFICES:** P. O. Box 1, Buffalo 5, N. Y., Phone: Bedford 737.

**BUYER DIRECTORY:** hardware: Lewis Wing; accessories: Robert Folker; metals: J. C. Rachow; electronics: Bernard Wysocki.

**BOEING AIRPLANE CO.:** Myron W. McClune, materiel manager (Seattle Div.); J. E. Miles, mgr., Materiel Section (Transport Div.); Wayne Perkins, materiel mgr. (Wichita Div.).

**PURCHASING OFFICES:** Materiel Dept., Seattle Div., P. O. Box 3866, Seattle 24, Wash. Phone: AXminster 8812. Materiel Section, Transport Div., P. O. Box 707, Renton, Wash. Phone: Broadway 4031. Materiel Section, 3801 South Oliver, Wichita, Kans., Phone: MUrry 3-8511, ext. 3906.

**CALLAIR:** Barlow H. Call, purchasing agent.

**PURCHASING OFFICE:** Afton, Wyo., Phone: 168.

**CESSNA AIRCRAFT CO.:** Ralph W. Wheeler, dir. of purchases (Commercial Aircraft Div.); V. A.



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## AIRCRAFT MFRS (Continued)

Stein, asst. purchasing agent (Commercial Aircraft Div.); William G. Grisamore, chief purchasing agent (Military Aircraft Div.); L. G. Lauder milk, sr. buyer (Military Aircraft Div.).

**PURCHASING OFFICES:** Commercial Aircraft Div., 5800 Pawnee Road, Wichita, Kans., Phone: MU 4-7261. Military Aircraft Div., Box 1977, Wichita, Kans., Phone: WH 3-3211.

**BUYER DIRECTORY:** Commercial Aircraft Div.: ferrous raw materials: M. M. Quinn; non-ferrous raw materials: E. D. Dye; accessories: R. P. Fuller; electronics: C. W. Jones; castings, forgings: L. B. Youngers; MRO: B. Wilson; hardware: C. Aust and H. Vieman, outside production: L. W. McIntire and J. E. Hoban. Military Aircraft Div.: hardware & standards: Glen Holmes; electronics: R. G. Sauder; outside production: R. T. Shirley and Dean Endicott; MRO: Nell Stewart.

**CHANCE VUGHT AIRCRAFT INC.:** B. A. Carlson, gen. purchasing agent. **PURCHASING OFFICES:** P. O. Box 5907, Dallas, Tex., Phone: Andrew 2-3211.

**BUYER DIRECTORY:** equipment & systems: J. R. Bruno; general purchases & expediting: A. J. Patton; subcontracting: W. H. Haugh.

**CONVAIR, A DIV. OF GENERAL DYNAMICS CORP.:** H. G. Golem, dir. of procurement; B. P. Gibbons, mgr. of material (San Diego); W. G. Evans, chief of subcontracting (San Diego); R. Kahn, mgr. of material (Fort Worth).

**PURCHASING OFFICES:** San Diego: P. O. Box 1950, San Diego 12, Calif., Phone: CY 6-6611. Fort Worth: P. O. Box 748, Fort Worth, Tex., Phone: PErshing 8-7311.

**BUYER DIRECTORY:** San Diego: gen. purchasing agent: H. N. May; equipment: G. J. Sheldon; facilities & supplies: R. C. Fildes; raw materials & hardware: E. F. Monsees. Fort Worth: gen. purchasing agent: major B-58 subsystems: T. C. Smith; minor B-58 subsystems: C. S. Hinton; hardware & special equip.: C. M. McCulloh; raw materials: Paul Logan; commercial material: J. I. Pratt; outside production: S. E. G. Hillman and T. O. Walshall.

**FAIRCHILD AIRCRAFT DIV., Fairchild Engine & Airplane Corp.:** S. T. Mulroney, mgr. of materials. **PURCHASING OFFICES:** Hagerstown, Md., Phone: RE 3-3600.

**BUYER DIRECTORY:** production materials: C. F. Murray; sub-contract assemblies: O. D. Collins; bulk & purchased parts: Harry McAbee; equipment: Donald Eyles; equip. & foreign purchased parts: Joseph Guinay; electronic equip.: H. D. Dusenberry; major equip.: B. L. Eisenberger; bulk & purchased parts: Mrs. V. B. Burkholder; purchased parts: Robert Clevenger and Mrs. Frances Couvatt; basic raw material: M. L. Bopp; raw material: Robert Orr.

**GOODYEAR AIRCRAFT CORP.:** H. A. Delaney, purchasing agent.

**PURCHASING OFFICES:** 1210 Massillon Road, Akron 15, Ohio, Phone: Republic 3-6361, ext. 288. **BUYER DIRECTORY:** raw materials: A. L. Graves-muehl; subcontracts: W. R. Reed.

**GRUMMAN AIRCRAFT ENGINEERING CORP.:** William N. Robertson, mgr. of procurement; Norman J. Egloff, purchasing agent. **PURCHASING OFFICES:** Bethpage, L. I., New York, Phone: WElls 1-1500.

**BUYER DIRECTORY:** electrical equip.: H. Pascale, L. Alpy, J. Foley, J. Giomboski, F. Nutchey; research & devel.: C. Nauss, W. Sheerin, S. Wlazlo; hydraulics: E. Hald, R. Barger, F. Cote, A. Fagan, P. Genthner, M. Kohn; hardware: A. Haussier, E. Maxwell; raw material: J. Burt, F. Wassung; machined parts: F. B. Wigley, J. Helfrick, S. Merin, J. C. Otto, E. Perinetti, D. Sire; forgings & castings: C. Palmer, A. Valentine; maintenance items: C. Harrnkind, H. Albertson, W. McCarthy, E. O'Neill, W. Young; government furnished equip.: E. Houghton, C. Ballard.

**LOCKHEED AIRCRAFT CORP.:** John A. White, dir. of material (Calif.); William R. Wilson, gen. purchasing agent (Calif.); N. Ricciardi, dir. of material (Georgia); C. H. Roha, gen. purchasing agent (Georgia); H. W. Sinnen, mgr.-outside manufacturing (Georgia); F. A. Kanzler, mgr.-purchasing dept. (Georgia); John N. Buckley, mgr.-purchasing operations (Georgia).

**PURCHASING OFFICES:** 2555 N. Hollywood Way, Burbank, Calif., Phone: Stanley 7-1241. 86 S. Cobb Drive, Marietta, Ga., Phone: 9-9411.

**BUYER DIRECTORY:** Calif.: purchased equip. dept.: John P. McCarthy; purchased parts dept.: J. H. Hanshue; non-productive buying & operations dept.: John S. Card; outside manufacturing: Ralph Harker. Georgia: office, factory and raw material: J. H. Stewart; electrical & systems: G. A. Carpenter; hydraulic & mechanical assemblies: B. C. Godwin; parts section: O. H. Malcolm; C-130 subcontracts: W. O. Boettiger; 8-47 subcontracts: R. W. Hitchcock; C-130 subcontracts & outside production operations: J. A. Jordan; C-130 subcontracts: B. K. Martin; construction & maintenance projects: J. H. Plage.

**MCDONNELL AIRCRAFT CORP.:** L. Harrison, v.p., procurement and quality control; W. J. Gamewell, purchasing mgr.; O. F. Everson, purchasing agent; N. A. Myers, purchasing agent; W. P. Becker, subcontracting mgr.; V. E. Gamewell, asst. subcontracting mgr.

**PURCHASING OFFICES:** P. O. Box 516, St. Louis 3, Mo., Phone: PErshing 1-2121.

**BUYER DIRECTORY:** general supplies: E. D. Fasler; raw materials: T. A. Fletcher; spares & GSE: E. B. Heibling; machinery & facilities: M. L. Aaron; mechanical aircraft equip.: C. A. Hoag; electrical & electronic aircraft equip.: A. R.

Kieffer; purchased parts: R. E. Lomax; forgings & castings: W. R. Worrell; machined parts, precision assemblies, tooling: E. R. Andrae; engineering subcontracts: E. C. Gray; airframe assemblies: K. B. McGinness; airframe assemblies: R. H. Schulte.

**MEYERS AIRCRAFT CO.:** A. Meyers, chief purchasing official. **PURCHASING OFFICES:** Tecumseh, Mich., Phone: 960.

**MOONEY AIRCRAFT, INC.:** F. W. Womack, chief purchasing official. **PURCHASING OFFICES:** Box 72, Kerrville, Tex. Phone: Clearwater 7-4043.

**NORTH AMERICAN AVIATION, INC.:** J. H. Campbell, dir. of material (Ohio); T. R. O'Connor, gen. purchasing agent (Ohio); D. L. Peitzke, dir. of material (Calif.); K. V. Pettersen, purchasing agent (Calif.).

**PURCHASING OFFICES:** Ohio: 4300 E. 5th Ave., Columbus 16, Ohio, Phone: BElmont 1-1851, ext. 212. California: Los Angeles Div., International Airport, Los Angeles 45, Calif., Phone: ORchard 2-9151. Oregon: 8-3011, Eastgate 2-1570. **BUYER DIRECTORY:** Ohio: operations: L. J. Babbitt; supply: R. S. Mulligan; equipment: H. B. Cather; hardware: L. F. Diehl; subcontracting: G. S. Brown. California: non-productive supplies: R. Capp; hardware: J. Freshaw; raw materials: V. Rumble; company furnished equip.: L. Young; sub-contracting: E. Hennarty.

**NORTHERN AIRCRAFT, INC.:** A. W. Wilson, purchasing agent. **PURCHASING OFFICES:** Box 41, Alexandria, Minn., Phone: Rockwell 3-4169.

**NORTHROP AIRCRAFT, INC.:** J. W. Hinchliffe, materiel mgr.; D. L. Miller, chief, off-site manufacturing; J. W. Korbel, asst. chief, off-site manufacturing; C. G. Keach, chief purchasing agent; M. H. Lafferty, purchasing agent (Florida facility).

**PURCHASING OFFICES:** 2031 E. Mariposa, El Segundo, Calif., Phone: ORegon 8-0411. **BUYER DIRECTORY:** electronics: M. M. Riggs; basic materials & equip.: J. G. Hebard; components: P. K. Smith; electronic assemblies: J. D. Willson; electromechanical items: H. Tackett; purchased parts: H. Linville; castings & forgings: W. Christensen; raw stock: J. N. Lowry; hydraulics & equip.: R. Rust; machined parts: F. Rosenthal; major subcontracts: R. Bolen; tooling: E. Franklin; non-productive items: C. E. Murray.

**ON MARK ENGINEERING CO.:** E. E. Britton, mgr. of purchasing. **PURCHASING OFFICES:** 7929 Hayvenhurst Ave., Van Nuys, Calif., Phone: Stanley 3-1030, State 6-8787. Coupling Div., 4440 York Blvd., Los Angeles, Calif., Phone: Clinton 4-2278. **BUYER DIRECTORY:** A & N hardware, shop supplies, aircraft components: Thaddeus White; fab-



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BUYER DIRECTORY: subcontract-aircraft sub-  
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sheet metal parts: A. H. Owens; aircraft equip.  
& accessories: C. Plosky; standard materials:  
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ial mgr.; W. J. Nichols, asst. material mgr.;  
R. W. Carr, general supv., outside production;  
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PURCHASING OFFICE: Conway-Pittsburgh Air-  
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material; J. Melton, asst. manager-material.

PURCHASING OFFICES: P. O. Box 6191, Dallas,  
Tex., Phone: Broadway 6-7111.

BUYER DIRECTORY: productive materials: J. A.  
Pendleton, Jr.; subcontracts: L. D. Miller; pur-  
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chasing agent; Stirling Souder, asst. purchasing  
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PURCHASING OFFICE: 8924 Bellanca Ave., Los  
Angeles 45, Calif., Phone: Oregon 8-4361.

TRECKER AIRCRAFT CORP.: Gary Reier, chief  
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## HELICOPTER MANUFACTURERS

**BELL HELICOPTER CORP.:** W. D. Wilson, chief purchasing agent.

**PURCHASING OFFICES:** P. O. Box 482, Ft. Worth, Tex. Phone: AT 4-3434.

**BUYER DIRECTORY:** machined details: T. C. Meek;

sheet metal assemblies, blades, cloth & fabric:

E. B. Fuller; plastic & specification items: J. E. Riley;

machined assemblies, service items: E. V. Ambrose;

tooling, office services: B. F. Graham;

raw materials, chemicals: L. H. Ambrose; maintenance,

stores, parts facilities: G. H. Grant; hardware:

K. S. McCoy; engines & accessories: L. E. Doherty;

47 & 204 part numbers, electrical items: J. F. Malone;

cabin accessories & hardware: W. C. Wilkes;

castings, forgings: G. C. Sutherland.

**BENSEN AIRCRAFT CORP.:** Robert W. Dyer, purchasing agent.

**PURCHASING OFFICES:** Purchasing Dept., Box 2725,

Raleigh, N.C., Phone: TE 2-8798 & TE 3-6622.

**BUYER DIRECTORY:** industrial equip.: Charles W. Brod;

hardware: Riley O. Carroll.

**CONVERTAWINGS, INC.:** David H. Kaplan, purchasing agent.

**PURCHASING OFFICES:** Zahns Airport, Amityville, L.I.,

New York, Phone: Amityville 4-4762.

**BUYER DIRECTORY:** instrumentation: Paul Davis;

mechanical components: Thomas Hanson.

**DOMAN HELICOPTERS, INC.:** Raymond G. Dugan, v.p. &

purchasing dir.

**PURCHASING OFFICES:** P. O. Box 603, Danbury, Conn.,

Phone: Pioneer 3-5521.

**BUYER DIRECTORY:** all purchases: Ernest J. Boda.

**HILLER HELICOPTERS:** L. B. Cameron, mgr.-purchasing;

T. T. Hudson, purchasing supv.

**PURCHASING OFFICES:** 1350 Willow Road, Palo Alto, Calif.,

Phone: Davenport 5-3241.

**BUYER DIRECTORY:** hardware & accessories: E. W. Sparks;

outside production: W. R. Rieckman.

**HUGHES TOOL CO., AIRCRAFT DIV.:** C. H. Witter, purchasing agent.

**PURCHASING OFFICES:** 260 West Beach Ave.,

Inglewood 3, Calif., Phone: ORegon 8-7181 & Orchard 1-8282.

**BUYER DIRECTORY:** raw materials, standard parts, subcontracting:

C. E. Ingalls; non-productive material, capital equip.,

office supplies: R. L. Jones; engineering & experimental material:

B. M. Lohr.

**KAMAN AIRCRAFT CORP.:** William F. Gerety, dir. of purchases;

J. F. Squires, purchasing agent.

**PURCHASING OFFICES:** 820 Park Ave., P. O. Box 94,

Bloomfield, Conn., Phone: Hartford Chapel 2-6241.

**BUYER DIRECTORY:** machined parts, sheet metal parts &

assemblies: E. N. Kelly; accessories, hardware, electrical parts,

metals: R. T. Hall.

**KELLETT AIRCRAFT CORP.:** H. A. Harner, Jr., purchasing agent.

**PURCHASING OFFICES:** P. O. Box 35, Willow Grove, Pa.,

Phone: OSborne 5-2930.

**BUYER DIRECTORY:** gen. purchasing: J. Rowland Nevin;

stationery & office supplies: B. Rarden.

**SIKORSKY AIRCRAFT, Div. of United Aircraft Corp.:** C. L. Beers,

purchasing mgr.; H. C. Lassen,

asst. to purchasing mgr.; R. E. Kidder, purchasing agent.

**PURCHASING OFFICES:** Bridgeport 1, Conn., Phone: Drexel 8-6361,

ext. 235, 236.

**BUYER DIRECTORY:** machined and vendor items:

M. R. Kopchick; metals, tools, raw materials and misc. machined parts

and extrusions: E. R. Gray and T. L. Shea; mechanical and

hydromechanical items, hydraulic components: R. G. Johnson and

W. Tinnard; instruments, furnishings, electromechanical items,

landing gear, engines and accessories, rescue equipment: I. C. Whittemore,

A. Pogor and A. J. Voytek; rotor heads, transmissions, castings &

forgings: A. P. Sorrentino; shipping containers, gears, rotor head components and

transmissions, broached & splined machined parts: W. E. Dever and

R. E. Stevens; castings, forgings, stampings: O. E. Lilling and

C. M. Cardillo; maintenance & product items: J. R. Legoyt; hardware,

fire fighting equip., electrical items, heaters, fabrics: P. W. Elko and

H. J. Sapal; carpenter supplies, gasoline and oils, medical and safety items, paints and

thinners, office equip., perishable tools: G. Thurkettle and

S. G. Kost.

**VERTOL AIRCRAFT CORP.:** Lewis G. Sinning, director of procurement.

**PURCHASING OFFICES:** 100 Woodland Ave., Morton, Pa.,

Phone: Kingswood 3-4000.

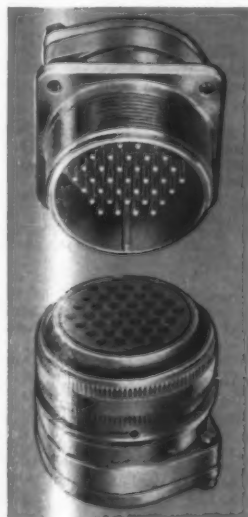
**BUYER DIRECTORY:** raw material and manufacturing supplies: N. M. Cavanaugh;

parts, equipment and components: I. Gindin;

office services and supplies: W. R. Bockus.

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JANUARY 27, 1958

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## ENGINE MANUFACTURERS

**AEROJET-GENERAL CORP.:** W. R. Rozance, dir. of materiel; T. E. Johnston, gen. purchasing agent (Azusa); J. H. Parsons, mgr. of materiel (Sacramento).

**PURCHASING OFFICES—Azusa:** 4352 N. Ordendale Ave., Azusa, Calif., Phone: Cumberland 3-6111, Edgewood 4-6211; Covina: 410 N. Citrus Ave., Covina, Calif., Phone: Cumberland 3-6111, Edgewood 4-6211; Sacramento: P. O. Box 1947, Sacramento, Calif., Phone: YUKON 5-5111.

**BUYER DIRECTORY—Azusa:** outside production: A. E. Lumley; tooling: J. B. Bertoldi; machined parts, castings & forgings: W. B. Kitchin; fabricated electrical, electronic & optical parts, special processing: F. R. Pechnick; assemblies, fabricated parts: K. F. Poe; purchasing: F. H. Gebhart; laboratory, maintenance supplies & equip., building materials: L. B. Peabody; raw materials, chemicals, small tools: L. Pell; standard electrical & electronic parts, machinery, fittings: J. C. Roth. Covina: facilities construction subcontracting: T. H. A. Turner, R. V. Balch. Sacramento: outside production: J. R. McLeary; sheet metal fabrication & assembly: H. D. Bess; tooling, forgings, castings, processing: R. H. Klingman; machined parts: J. R. Mauck; purchasing: H. R. Tharaldson; maintenance and plant engineering, hardware, tools: W. R. McAfee; raw materials, chemicals, building supplies, plastics, electronics: J. L. Takacs.

**AIRCooled MOTORS, INC.:** A. Kemp Stevens, dir. of purchases.

**PURCHASING OFFICE:** Liverpool Rd., Syracuse 8, N. Y., Phone: OLdfield 2-3711.

**ALLISON DIV., GENERAL MOTORS CORP.:** Frank J. Girolanni, dir. of purchasing & materiel control. **PURCHASING OFFICES:** P. O. Box 894, Indianapolis 6, Ind., Phone: Chapel 4-1511.

**BUYER DIRECTORY:** purchasing & materiel control, Plant 5: J. W. Payne; purchasing & materiel control, Plant 6: R. E. Swords.

**FAIRCHILD ENGINE DIV., FAIRCHILD ENGINE & AIRPLANE CORP.:** E. W. Hill, dir. of procurement.

**PURCHASING OFFICES:** Comac Road, Deer Park, L. I., New York, Phone: Deer Park 2-7211.

**BUYER DIRECTORY:** fabricated parts, assemblies, accessories: Peter V. Ceres; production tools, factory & mill supplies: J. Ralph Walker.

**AIRCRAFT ENGINE DIV., FORD MOTOR CO.:** C. O. Slaght, general purchasing agent. **PURCHASING OFFICES:** 7401 S. Cicero Ave., Chicago 29, Ill., Phone: REliance 5-4200.

**BUYER DIRECTORY:** raw materials, weldments, assemblies, stampings & machined parts: C. P. Swatsinger; office equip., maintenance supplies: O. D. Hanna.

**GENERAL ELECTRIC CO.:** C. B. Adams, mgr. purchasing, E. A. Jones, materials mgr. (Everett); W. C. Coats, materials mgr. (West Lynn); C. Treas, materials mgr. (West Lynn); F. N. Estes, materials mgr. (Cincinnati); W. B. Boyd, materials mgr. (Cincinnati).

**PURCHASING OFFICES—New York:** Purchasing Service, 25th Floor, 570 Lexington Ave., New York 22. Everett: Small Aircraft Engine Dept., 62 Tremont St., Everett, Mass. West Lynn: Aircraft Accessory Turbine Dept., 950 Western Ave., West Lynn, Mass.; Small Aircraft Engine Dept., 1000 Western Ave., West Lynn, Mass. Cincinnati: Production Engine Dept., Box 132, Jimson Rd., Cincinnati 15, Ohio. Erie: Aircraft Generator Manufacturing Sub-section, 3001 E. Lake Rd., Erie, Pa.

**BUYER DIRECTORY—New York:** ferrous materials: A. R. Cooke; non-ferrous materials, K. E. Agan. E. H. Wright. Everett: jet engine components: J. W. Gowell. West Lynn: small jet engines &

accessories: W. M. Badger; jet engine dyes: J. J. Walsh. Cincinnati: mfg. & overhaul of jet engines & spare parts: F. H. Mott, R. E. Eckel, R. J. McElligott; assembly & spare parts: T. E. Shrimpton; components mfg. & engine rebuilding: J. W. Long, J. B. Paul, J. F. McLoughlin. Erie: ac & dc aircraft generators & starter generators: M. W. Brosius.

**LYCOMING DIV., AVCO MANUFACTURING CORP.:** C. L. Briceland, purchasing mgr.; C. J. Rapuano, purchasing mgr. (Stratford).

**PURCHASING OFFICES:** Williamsport, Pa., Phone: 3-6181; Stratford, Conn., Phone: Drexel 8-0431.

**BUYER DIRECTORY—Williamsport:** hardware, metals, electronics & accessories: W. A. Hoffman. Stratford: hardware, metals, electronics & accessories: H. R. Norman.

**THE PRATT & WHITNEY AIRCRAFT DIV. of the**

## AIR MATERIEL COMMAND

**HEADQUARTERS,** Wright-Patterson AFB, Ohio: Gen. Edwin W. Rawlings, commander; Maj. Gen. W. O. Senter, director of procurement and production. Phone: Clearwater 3-7111.

**PROCUREMENT ITEMS:** Propellers; wheels, brakes, skis, floats; engine electrical equip.; system accessories; safety belts, shoulder harness; aircraft auxiliary fuel tanks; aircraft navigational instruments; aircraft flight instruments; aircraft engine instruments; autopilots, gyro controls; misc. aircraft accessories and components; radio navigational equip.; radar equip., airborne search and



**RAWLINGS**  
Commander, AMC



**SENER**  
Div., procurement

navigation; radar equip., airborne armament; rocket engines and parts; truck-mounted machine shop sets, kits, outfits; trailers for aircraft launching equip., machineshop sets; launchers, rocket and pyrotechnic; armament fire control equip.; ammunition, explosives; tractors, track-laying, wheeled, tracked; aircraft tires and tubes; turbo-superchargers; generators, generator sets; photographic equip.; drawings, microfilm specifications; microfilm processed.

## AIR MATERIEL AREAS

**MIDDLETOWN AMA,** Olmsted AFB, Pa.: Maj. Gen. George R. Acheson, commander; Col. L. H. Garrett, director of procurement and production. Phone: Whitney 4-5521.

**PROCUREMENT ITEMS:** Aircraft training aids, instruments, standard parts; misc. flight instruments and parts; electric meters and parts; parachutes, aerial pickup, delivery and cargo tie-down equip.; compressed and liquefied gases; gas cylinders; fuels, lubricants, oils and waxes.

**MOBILE AMA,** Brookley AFB, Ala.: Maj. Gen. D. F. Callahan, commander; Col. Donald A. Olson, dir. of procurement and production. Phone: Hemlock 8-3461.

**PROCUREMENT ITEMS:** Aircraft breathing oxygen

Unit Aircraft Corp.; Earle E. Champion, purchasing mgr.

**PURCHASING OFFICES:** 400 Main St., East Hartford, Conn., Phone: JA 8-4811.

**BUYER DIRECTORY:** finished parts: George F. Flavel; raw materials: Robert E. Dunne; experimental section: Donald L. Brown, Jr.; non-product section: Marshall J. McGuire.

**WESTINGHOUSE ELECTRIC CORP., Aviation Gas Turbine Div.:** Clarence A. Davis, mgr. of purchases; John B. Nason, purchasing agent.

**PURCHASING OFFICES:** P. O. Box 288, Kansas City, Mo., Phone: Delmar 3-7400.

**BUYER DIRECTORY:** accessories & subcontracts: John L. Payne; raw materials & hardware: Clement S. Plekarski; capital equipment & tooling: John Michalko; construction, long term maintenance & expense: R. V. George; administrative services: R. R. Greene.

equip. and parts; marine equip. and parts; small craft; pontoons, floating docks; ship and marine equip.; valves, powered and nonpowered; alarm and signal systems.

**OKLAHOMA CITY AMA,** Tinker AFB, Okla.: Maj. Gen. T. O. Gerrity, commander; Col. Charles S. Esau, dir. of procurement and production. Phone: Pershing 2-7321.

**PROCUREMENT ITEMS:** Misc. aircraft accessories and parts (except safety belts and harness); hydraulic and vacuum deicing system components; engine cooling system components; engine fuel system components (also see San Antonio AMA); engine air and oil filters, strainers, cleaners; misc. engine accessories.

**OGDEN AMA,** Hill AFB, Utah: Brig. Gen. Paul H. Robey, commander; Col. Frank L. Tenney, dir. of procurement and production. Phone: Ogden 5-2211.

**PROCUREMENT ITEMS:** Aircraft hydraulic struts, cylinders and parts; school equip. (trainers for ground instruction purposes); biological weapons; training aids and devices.

**SAN ANTONIO AMA,** Kelly AFB, Tex.: Maj. Gen. Thetus C. Odom, commander; Col. Hugh J. Mattia, dir. of procurement and production. Phone: Walnut 3-5411.

**PROCUREMENT ITEMS:** Aircraft engine electrical systems; hazard detecting instruments and apparatus; engine fuel systems and components; electric motors; electric converters; electric vehicular lights, fixtures.

**SACRAMENTO AMA,** McClellan AFB, Calif.: Maj. Gen. George E. Price, commander; Col. John R. Coolidge, dir. of procurement and production. Phone: Wabash 2-1511.

**PROCUREMENT ITEMS:** Aircraft and airborne structural components; engine and maintenance parts; aircraft and engine accessories, maintenance parts; aircraft and training aids, instruments and electric meters; fuels, lubricants, gases; communications equip.; aircraft ground servicing equip., marine equip., electrical generator sets and materials handling equip.; school equip.; printing, reproduction, binding and auxiliary equip.; lighting fixtures, lamps.

**SAN BERNARDINO AMA,** Norton AFB, Calif.: Maj. Gen. Edward W. Anderson, commander; Col. Denny L. Redd, dir. of procurement and production. Phone: San Bernardino 9-4411.

**PROCUREMENT ITEMS:** Aircraft and airborne structural components; aircraft accessories, parts, aircraft hardware, rubber materials, coatings and bearings; aircraft and training aids, instruments and electric meters; aerial delivery equip., paratroop protective covers and survival equip.; school



equip.; weapons, ammunition, explosives, warfare gases, handling and emplacement equipment and special weapons.

**WARNER ROBINS AMA**, Robins AFB, Ga.: Maj. Gen. A. V. P. Anderson, Jr., commander; Col. Thomas O. Lawton, Jr., dir. of procurement and production. Phone: Walker 2-5341.

**PROCUREMENT ITEMS:** Shop machinery, equip. and accessories; timekeeping, navigational components, optical instruments and parts; aircraft armament; aircraft components and accessories; aircraft launching, landing and ground handling equip.; tires and tubes; construction, mining, excavating and highway maintenance equip.; materials handling equip.

## AIR FORCE DEPOTS

**DAYTON AF DEPOT**, Gentile AF Station, Dayton, Ohio: Brig. Gen. C. A. Helm, commander; Col. Robert L. Salzarulo, dir. of procurement and production. Phone: Madison 6551.

**PROCUREMENT ITEMS:** Radio crystals; capacitors; coils and transformers; non-aircraft engine electrical systems; knobs and pointers; inspection gages; laboratory and shop test equipment; wood-working machinery and equip.; measuring tools; resistors; fuses and lightning arresters; circuit breakers; switches; connectors; lugs, terminals and terminal strips; relays, contactors, solenoids; electron tubes, transistors, rectifier crystals; dielectric insulators and insulating materials, hardware and supplies, contact brushes and electrodes; antennae, waveguides and related equip.; cable, cord, wire assemblies.

**ROME AF DEPOT**, Griffiss AFB, N. Y.: Brig. Gen. Clyde H. Mitchell, commander; Lt. Col. H. E. Greuter, dir. of procurement and production. Phone: Rome 3-200.

**PROCUREMENT ITEMS:** Misc. electric, electronic components and electrical supplies; ground radar navigational equip.; ground radar equip.; meteorological equip. and supplies; telegraph, teletype, facsimile equip.; ground radio communications equip.; telephone and wired audio equip.; headsets, microphones, speakers; electrical control equip.; transformers, distribution and power station; rectifying equip.; primary and secondary batteries; wire and cable; misc. electric power and distribution equip.; lighting fixtures; photographic supplies.

## LATE AMC DEPOT CHANGES

Five Air Force depots are now in the process of being phased out. Their previous procurement and production activities are being transferred as follows:

**GADSDEN AF DEPOT**, Gadsden AF Station, Ala.: General and specialized equip. and supplies, including building, heating and air-conditioning equip., to Mobile AMA; electrical and electronic equip. and supplies, including electrical generators and generator sets, to Sacramento AMA.

**TOPEKA AF DEPOT**, Topeka AF Station, Kans.: Fuels and metals, hardware and tools to Mobile AMA; chemicals and chemical products to Middletown AMA; ground handling, safety and maintenance equip., motor vehicle maintenance and repair shop specialized equip.—including automotive lifts, wheel aligners, brake service equip. and tire maintenance— to Warner Robins AMA.

**MAYWOOD AF DEPOT**, Maywood, Calif.: Electrical and electronic equip. and supplies, excluding electrical generators and generator sets, to Dayton AFD; headsets, handsets, microphones and speakers to Rome AFD; aircraft tires and tubes (pneumatic) to Ogden AMA; tires and tubes, tire rebuilding, tire and tube repair materials to Warner Robins AMA; government-furnished aeronautical equip. to San Bernardino AMA; communications and electronic schemes assembly to Sacramento AMA.

**MEMPHIS AF DEPOT**, Mallory AF Station, Tenn.: Service and trade equip., to Middletown AMA; nonpowered hand-tools to Mobile AMA. AF Material Services Office to Middletown.

**SHELBY AF DEPOT**, Wilkins AF Station, Ohio: Rubber and nonmetallic fabricated materials to Mobile AMA; technical publications to Oklahoma City AMA; casings, tires and inner tubes for aircraft, flying field and hangar equip., prefab

## Who's who in aeronautical purchasing

This special directory of "Who Buys What" in aviation, the first name-by-name account of key personnel in airline, manufacturing and military procurement, is being presented by AMERICAN AVIATION as an important element of this and future reader feature supplements on aeronautical purchasing.

As a first-of-the-year report of the top names in aviation buying, to be published annually, it will

prove an invaluable desk-top tool in the day-to-day business of all phases of industry.

**NOTE:** The directory of military procurement offices does not include Army activities. This information will be published, instead, in AMERICAN AVIATION's first annual Special Issue on Army Aviation (March 10) as part of a more comprehensive Contractors' Guide to Army Aviation.

buildings and special purpose maintenance parts, firefighting, rescue and safety equip. to Warner Robins AMA; aircraft tires and tubes to Ogden AMA.

## NAVY PROCUREMENT OFFICES

**BUREAU OF AERONAUTICS**, Dept. of Navy, Washington 25, D. C.: RADM. R. E. Dixon, chief. Phone: Liberty 5-6700.

**PROCUREMENT ITEMS:** Propellers; aircraft launching equip.; electric aircraft actuators; electric cabin and cockpit heaters; tow target releases; barrier materials; catapults; aircraft loading ramps; energizers; radio communications equipment; beacons; beams; control tower equipment; direction finder groups; airborne radio navigation and air traffic control equip.; oscillators; airborne radios and equip.; ground radios and equip.; airborne navigation instrument transmitters; intercommunication equip.; radar equip.; airborne detection sets; altimeters; amplifiers; computers; direction, distance, elevation and range indicators; misc. meters; modulators; sonar; radiac equipment; infrared; switches; headsets, microphones, speakers; electric motors; electric control equip.; electric generators and generator sets; aircraft fuel systems components, booster coils, distributors, engine generators, ignition harness assemblies, magnetos, manifold assemblies, engine starters, engine pumps, engine coolant radiators, engine filters, turbosuperchargers, engine control quadrants; fire trucks, hose, reels, trailers; aircraft sextants; aircraft compasses; accelerometers; altimeter indicators; controls, gyroscopes, assemblies, regulators, valves and servos; gages and gage assemblies; indicators; fuel flow transmitters; misc. aircraft meters; oscillographs; oscilloscopes; weather balloons; indicators, computers, recorders; aviation seaplane and barrier deck lighting fixtures; ladders; aircraft test stands; engine test cell equipment; shop equipment; aircraft training aids.

**BUREAU OF ORDNANCE**, Dept. of Navy, Washington 25, D. C.: RADM. F. S. Withington, chief. **PROCUREMENT ITEMS:** Electron tubes; transmitters; rectifying crystals; dry cell batteries.

**BUREAU OF SHIPS**, Dept. of Navy, Washington 25, D. C.: RADM. A. G. Mumma, chief.

**PROCUREMENT ITEMS:** Unmounted antifriction bearings; plain unmounted bearings; books and pamphlets; telephone, telegraph, teletype, facsimile, radio communications, intercommunication equip.; sound recording and reproduction equip.; radar equip.; sonar; radiac equipment; infrared; electron tubes, transistors and rectifying equip.; antennae, wave guides and related equip.; electric motors; electric control equipment; dry cell batteries; electric wire and cable; misc. power equip.; diving and salvage apparatus; generator and generator sets; hull type coolers; extinguishers, axes, rakes, brooms; azimuths, sextants and octants; other meters; lubrication and fuel dispensing equip.; winches.

**BUREAU OF YARDS AND DOCKS**, Dept. of Navy, Washington 25, D. C.: RADM. E. J. Peltier, chief. **PROCUREMENT ITEMS:** Cranes, derricks, hoists.

**OFFICER IN CHARGE, NAVY PURCHASING OFFICE**, Main Navy Bldg., 17th and Constitution Ave., Washington 25, D. C.: Capt. I. N. Tripi, chief.

**PROCUREMENT ITEMS:** Floor Sanders, polishers and vacuum cleaners; electric motors; generators and

generator sets; files, rasps, saws, blades and frames, edge tools, mechanical measuring tools; chests, kits and sets of a variety of types of tools; industrial cutlery; fastening devices; industrial X-ray machines; portable conveyor units; trucks, trailers, tractors, stackers and accessories; push carts, handcars, wheelbarrows; industrial batteries; pallets and pallet trucks; calipers, tapes, squares, straight edges, vernier, gages, levels, plumb rules, protractors; metal rules, scales; sets, kits and outfits of measuring tools; bending and forming machines; power-driven presses; punches and shearing machines; forging machines and hammers; wire and metal ribbon forming machines; drawing machines; metal finishing equip.

**AVIATION SUPPLY OFFICER**, Naval Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, Pa.: RADM. John W. Crumpacker, chief.

**PROCUREMENT ITEMS:** Propellers; propeller hub barrels, aircraft rotor blades, rotor hubs, spinners, propeller synchronizers; landing shock struts; aircraft wheel and brake systems, landing floats, landing skis, auxiliary fuel tanks, hydraulic accumulators, lifting bags, actuating cylinders; hydraulic pumps, aircraft pressurizing and breathing equip.; cargo and personnel parachutes; parachute canopies; aerial delivery containers; aerial delivery slings; aircraft cargo tiedown equipment; safety belts and shoulder harnesses; cabin and cockpit heaters; tow target releases; aircraft windshield wipers; deceleration parachutes; tow bars; fin tilt jacks; landing gear lock assemblies; books and pamphlets; radio communication equip.; sound and recording equip.; radar equip.; headsets, microphones and speakers; electric hardware and supplies; electric motors; electric control equipment; electric generator and generator sets; dry cell batteries; electric wire and cable; power-driven presses; punches and shearing machines; forging machines and hammers; wire and metal ribbon forming machines; drawing machines; metal finishing equipment; aircraft air-conditioning equip.; tires and tubes.

**SUPPLY OFFICER, NAVAL GUN FACTORY**, Building 176, M Street at 8th S.E., Washington 25, D. C.: Capt. P. C. Herlihy, chief. **PROCUREMENT ITEMS:** Electric generators and generator sets.

## U.S. MARINE CORPS

**QUARTERMASTER GENERAL**, Headquarters, U.S. Marine Corps, Washington 25, D. C.: Gen. Randolph M. Pate, commander.

**PROCUREMENT ITEMS:** Unmounted antifriction bearings; unmounted plain bearings; books and pamphlets; acetylene; carbon dioxide; floor Sanders, polishers, vacuum cleaners; brooms, brushes, mops and sponges; cleaning and polishing compounds; circuit breakers; switches; electric connectors; lugs, terminals and terminal strips; coils and transformers; electronic tubes, transformers and rectifying crystals; antennae, waveguides and related equipment; relays, contactors and solenoids; electric motors; electric control equip.; dry cell batteries; electric wire and cable; extinguishers, axes, rakes, brooms; bolts, studs, screws; nuts and washers; nails, keys and pins; discs, wheels, stones, abrasives; lubrication and fuel dispensing equip.; pushcarts, handcars and wheelbarrows; bending and forming machines; power-driven presses; punches and shearing machines; forging machines and hammers; wire and metal ribbon forming machines; drawing machines; metal finishing equip.; welding, flame cutting and metalizing equip.

# For Extreme Temperatures *Plus* Perfect Seal

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- HIGH PRESSURE PNEUMATIC SYSTEMS
- LIQUID OXYGEN SYSTEMS
- HYDRAULIC SYSTEMS
- EXHAUST SYSTEMS
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Problems of connecting tubing and ducting of dissimilar metals subject to extreme temperatures can be solved with the new Marman Conoseal Tubing Joint. An all-metal joint, it provides metal gasket compression with the flexibility and sealing qualities formerly obtained only through use of organic seals. The Conoseal Joint withstands linear deflections up to 1/16-inch without sacrificing a perfect seal.

The seal is maintained under extreme pressures and temperatures even on joints with material transitions, in

which steel and aluminum alloy plumbing are joined.

The Conoseal Tubing Joint is available in three different operating performance ranges to meet varied applications. Standard sizes from 1" to 12" O.D. tube size, with special sizes designed to your requirements. Write today for full engineering details.

Operating Range	Temperature Range (°F.)	Max. Pressure (3" Size @ 70°F.)
Low	-300 to +750	1300 psig.
Medium	-300 to +1000	3300 psig.
High	-300 to +1800	6000 + psig.

Conoseal is an Aeroquip Trademark

## MARMAN DIVISION

## Aeroquip Corporation

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AERO DESIGN'S new Model 720 Alti-Cruiser executive aircraft is pressurized and air-conditioned; carries 4-7 passengers.

## Aero Design offers pressurized version of Commander

by Albert W. Bentz

THE HIGHLY COMPETITIVE executive aircraft market has a new and important contender for 1958—Aero Design and Engineering Co.'s pressurized and air-conditioned Model 720 Alti-Cruiser.

Aero took the wraps off this new four- or seven-place twin this month, claimed it is the most completely instrumented aircraft designed exclusively for the business executive.

Company's annual distributors meeting, at which the new design was announced, was marred by crash of the prototype when it took off with empty fuel tanks. However, it had completed its CAA tests and Aero was awarded a type certificate. The wrecked aircraft was trussed up in the company's Norman, Okla., facility where the distributors and visitors were permitted to inspect it closely. Twenty-one firm orders were immediately forthcoming.

Basically, the Alti-Cruiser is a follow-on of previous Commanders. It is a Model 680 with beefed-up structure to take care of pressurizing.

The aircraft is being offered in two configurations—straight seven-place or four seats plus lavatory. The \$183,750 pricing includes everything for all-weather operation except deicer systems and weather avoidance radar. The latter are optional, as is an autopilot. It has complete dual instrumentation.

The cabin pressurization system is similar to that used in transport aircraft. AiResearch developed the automatic cabin pressure control system. A single-stage hydraulically driven centrifugal compressor, manufactured by

Fairchild's Stratos Division, is used as the cabin supercharger. Also included in the system are variable delivery engine-driven hydraulic pumps by Strato-power Division, New York Air Brake Co.; Sunstrand Aviation's supercharger hydraulic drive motor; Stratos Bur-20 turbine bootstrap cooling unit, and Barber Colman integrated controls for the system's components.

A 40,000-btu Janitrol gasoline heater provides cabin heat either during supercharger or ram-air operation. Ram air is provided by an airscoop atop the fuselage.

The pressurization system reduces cabin pressure 5,000 to 7,000 ft.—to 10,000 ft. at 15,000-ft. altitude, 13,000 ft. at 20,000.

"They said," explained R. J. White, vp-director of sales, "that you couldn't

pressurize a slab-sided fuselage. But we did."

Principal structural changes to take care of pressurizing was the addition of stiffeners and sealing the cabin airtight.

An outstanding feature of the Alti-Cruiser is the new silicone paint job which gives it an exceptionally smooth finish. The interior also is new, with tuck-away arm rests on the seats and generous use of leather and wood paneling throughout.

Range is set at 1,500 miles at 10,000 ft. with 55% rated power. Top speed is 260 mph, service ceiling 25,567 ft. Empty weight is 4,800 lbs., gross 7,000.

Total weight of the pressurization-air-conditioning system is about 250 lbs.

NEW PLANT of Aero Design & Engineering Co. at Tulakes, Okla., was dedicated Jan. 11. First aircraft rolled off assembly line Dec. 21, just four months after company's old plant was destroyed by fire. New plant, with 126,000 sq. ft. of space, cost \$6.25 million, including equipment.





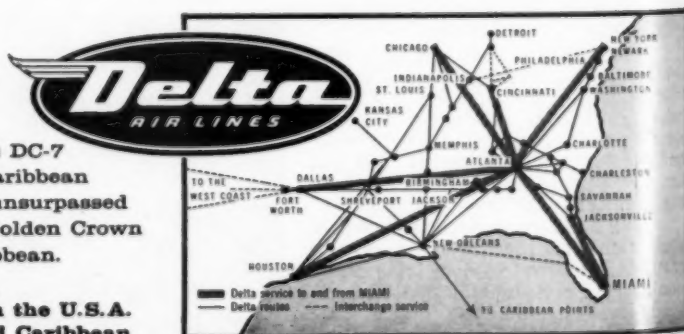


## Delta to Miami...trunk line to Sunshine

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# Bendix Radio tailors R&D to both civil, military markets

by Henry P. Steier

A TOP STAKEHOLDER in future military and commercial aviation electronics is Bendix Radio, whose military radar capability is tailored to a key need cited in President Eisenhower's eight-point State of the Union safety "insurance" program, and whose commercial aviation business amounts to about half of the U.S. total among competing products.

A division of Bendix Aviation Corp., Bendix Radio holds the leading position as producer of heavy radars for operational use in the U.S.-based air defense system. Bendix's effort in this area was a significant factor in recently announced peacetime record sales of \$707 million for the corporation in 1957.

The figure represents a 22.3% increase in sales over 1956. Profit rose 13.3%. Of total sales, 63.9% were in aviation products.

Emphasized among the accelerated defense efforts called for by Eisenhower was "improvement of warning equipment." This equipment would undoubtedly be largely in the radar field.

Biggest cost item in current U.S. warning-system planning is the Semi-Automatic Ground-Environment (SAGE) system being implemented across the country. However, there is reason to believe that advances in aircraft weapons may rapidly obsolete SAGE's capability to cope with enemy aircraft attacks. There is not only an urgent need to keep SAGE updated for current needs but to consider the possibility of its future relationship with an ICBM detection scheme.

Important factor is consideration of SAGE component designs amenable to periodic updating. In this way equipment might be modified to take care of new threats instead of becoming obsolete.

## New radar proposed

Bendix is concentrating a sizable part of its engineering effort on getting the most out of the present SAGE "L" band radar system as first line of U.S. defense for the next three to four years.

Tremendous investment the Air Force has in this vast electronic environment requires protection against obsolescence. This can be done by improving inherent capabilities of the present system to the utmost.

One outcome of the Bendix program to accomplish this is a strikingly different new radar identified by the code name "Rapier." Its development was undertaken in a joint program with Sanders Associates and uses that firm's PANAR (Panoramic Airborne Radar) technique.

Objective of the development was a three-dimension radar system of minimum complexity which gives extremely precise information on target elevation as well as azimuth.

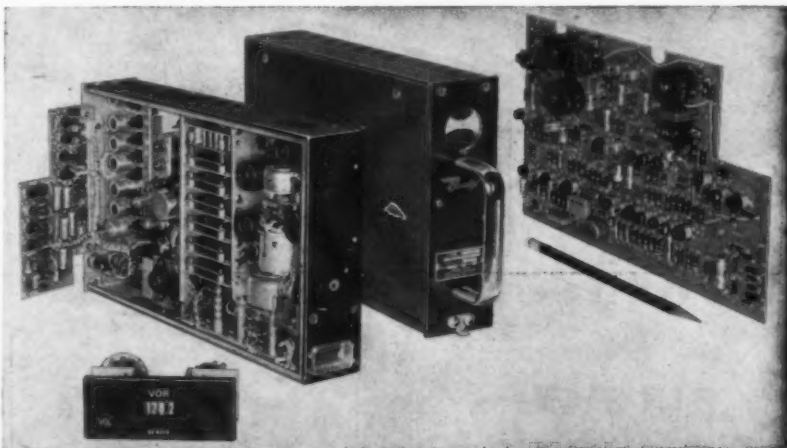
Also, it suits a SAGE need to acquire more target height information in a shorter time as weapon performance improves.

The new radar is said to have improved anti-jamming capability which is badly needed in the light of rapidly developing countermeasures technology.

The radar system has a range of more than 100 miles. It is expected that, as aircraft speeds increase, such terminal system ranges will be needed.

Although it has set its sights on today's immediate needs, Bendix has devoted some effort to the prospect of future ICBM defense.

Bendix has already written a proposal on ICBM defense which it says is much simpler than the vast SAGE network. The company intends to continue studies along this line.



SOON TO BE PRODUCED by Bendix are these short ¼-ATR RA-21A 360 channel VHF communication (left) and NVA-21A navigation unit packages (right). Transistors, printed wiring boards and printed inductances have made big size cuts possible. Boards are hinged for easy access. Board at right goes in nav-aid unit.

Another advantage of Rapier is its efficient use of the antenna aperture. Unlike those in some of the radars, the entire aperture is used for signal reception. This improves the relationship of power output to signal level received.

No mechanical antenna scanning motion is used for getting elevation information. Such scanning is done electronically. Reflector of Rapier measures 40 by 35 feet.

Full technical information on Rapier is not available. Done without contract support, it is being proposed to the Dept. of Defense for SAGE use.

Although the present Rapier design would not detect missiles, the basic design could be modified for such future use. Another application would be in 3-D radar work planned by the Airways Modernization Board for traffic control use.

Another new radar being developed by the company is a long-range terminal system for military airport surveillance.

At this time, 75% of Bendix Radio's government sales come from its heavy radar work. Remaining effort of its Government Products Department is in the navigation, communication and R&D fields.

Under way in the department's R&D activity is an Air Force study program on an air collision avoidance system.

Work is said to be well on the way to a solution which involves aircraft-to-aircraft transmissions of range information and air-to-ground transmissions for measuring altitude.

According to Charles G. McMullen, director of engineering, Government Products Department, Bendix is convinced a cooperative system can do the job, depending upon the range over which it must operate.

Many of the problems, he said, are much the same as those encountered in bomber defense system work. Most important aspect of the collision-prevention solution, however, is altimetry, McMullen emphasized.

Other items being developed by the department are improvements on the unique ARN-50 civil navigation aids package for the B-58 Hustler (AMERICAN AVIATION, June 18, 1956), transistorization of ARN-14 VOR equipment for Lockheed's F-104, and a UHF drone-locating radio system.

The TA-104A drone system is a locating link between a chase aircraft and a drone. It is a single-channel transmitter which emits an audio tone modulated radio frequency signal. A direction-finder on the chase plane is used to find the drone's bearing, and phase measurement of the audio signal permits distance to be derived.

Outlook for Bendix to expand its

present position as holder of 50% of sales among competing nonmilitary aviation equipment products is excellent.

Together with such sales in the weather radar, navigation and communication market, the company is looking to impending use of Doppler navigation, and the vast sales area opening up in business aircraft use.

According to Clarence Rice, manager, Aviation Electronics Products Dept., Bendix expects to have a Doppler navigator this year that will be approved by the airlines industry.

It will be an FM/CW device designed for transmitter location either at the aircraft's electronics rack or at the

antenna. Bendix originally adopted the at-the-rack approach. However, for rack locations in planned jets, it now appears a prohibitively long wave guide run would be needed.

On the computer issue, Bendix leans to provision of the simplest type but one that shows the relationship between a prescribed course and present position.

Cost of the Doppler system may run from \$12,000 to \$15,000, Rice said. It will weigh from 60-70 lbs.

Despite its initial setback when United Airlines purchased weather radar from Radio Corp. of America, Bendix now practically shares that market on a 50% basis with RCA, Rice said.

To fit the growing market for weather radar installations in a wider variety of business and commercial aircraft, Bendix has designed its line around building-block components.

A new 1/2-ATR, RDR-1D, transmitter-receiver weighing 26 lbs. and a 1/2-ATR synchronizer-power supply weighing 21 lbs. are the basic "blocks." With them may be used antennas with diameters of 30, 22, 18 and 15 inches, so that all aircraft may carry weather radar.

In addition to its primary function, the new system also serves for ground-mapping and terrain-avoidance.

#### Other new products in works

For further improvement of its radar, Bendix plans to have available in the fall of 1958 a bright tube indicator. Recent improvements on this tube by Hughes and RCA will make it practical for weather radar.

Being readied for production, which will start this summer, are additions to the Bendix line of lightweight equipment that represent drastic reductions of size, weight and power.

One of these is a 360-channel VHF receiver, the RA-21A, which, including its power supply, occupies only a short 1/4-ATR space. This represents about a 70% reduction over equivalent equipment available elsewhere. Weight is 9 lbs., including power supply.

In addition, there is a VOR navigation unit, the NVA-21A, of short 1/4-ATR size, which weighs 7 1/2 lbs., and a 360-channel VHF 25-watt transmitter of short 3/8-ATR size. Weight of this is 13 1/2 lbs. with ac power supply and 11 lbs. with dc supply.

Key to these big cuts is transistorization and use of printed wiring boards and printed inductance boards. In conjunction with these techniques, hinging of the boards and pluggable major functional circuits has been adopted for easy access and servicing.

Until now Bendix has followed a policy of considerable conservatism in the use of these techniques for its aviation equipment. This cautiousness appears ready to pay off through the time gained to do research on major changes.

Circuits operating at up to seven megacycles are transistorized in the

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THE VITAL DIFFERENCE

## Why Fluoroflex®-T 3000 psi hose controls Hustler nose gear

HERE'S A nose gear that, during retraction, pivots and folds in several places to clear weapons pod. Its steering system conveys hydraulic fluid at 3000 psi. Vital to its performance: *flexible, reliable, and corrosion-proof* high pressure lines.

First to have passed Wright Field high pressure, high temperature tests, Fluoroflex-T R700 flexible hose was ready for this difficult job . . . was fully proven by two years flight service. Its small O.D. is right for the compact system. It is lightweight. With low volumetric expansion under pressure peaks, it contributes to instant response in steering.

And, as in all Fluoroflex-T hose, the special patented tube gives complete immunity to all hydraulic fluids — while Resistoflex-designed fittings assure fully against blowoff.

Use of Fluoroflex-T hose assemblies on the B-58 doesn't stop with the nose gear. They're on the airframe and engines as well.

### REMEMBER:

Properties of products made from Teflon powder can change manyfold with minor variations of processing method. The fabricator's experience is therefore your best assurance of quality and reliability. So specify Fluoroflex-T . . . for the hose backed by unmatched experience.

Send for data . . . and ask for copy of our 64-page aircraft plumbing handbook if you don't have one.

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Originators of high temperature fluorocarbon hose assemblies

# Resistoflex

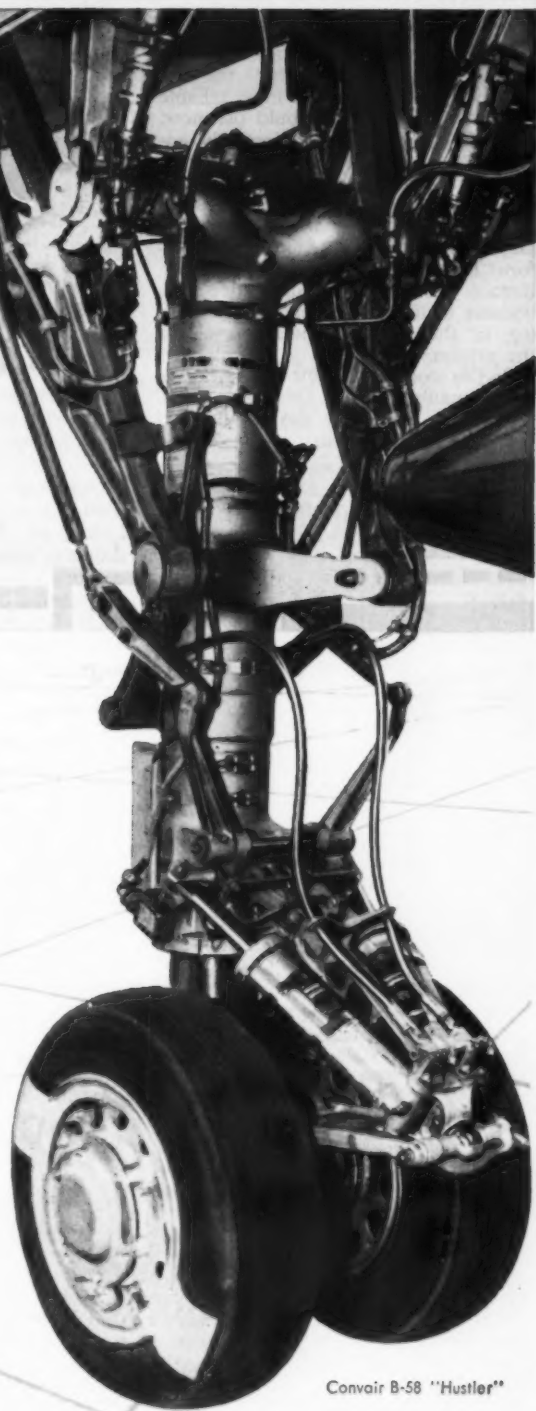
CORPORATION

Roseland, New Jersey • Western Plant: Burbank, Calif. • Southwestern Plant: Dallas, Tex.

JANUARY 27, 1958

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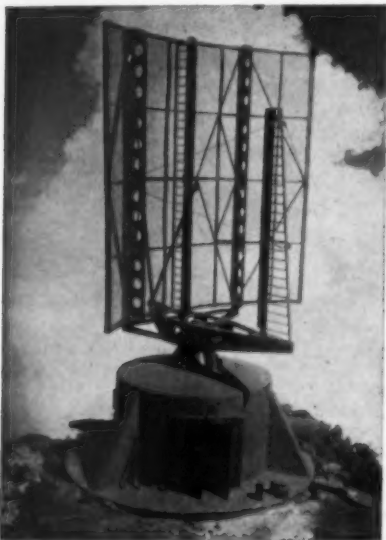


Convair B-58 "Hustler"

new Bendix equipment. According to J. Lane Ware, chief electronics engineer, Aviation Products Dept., this frequency appears to be the most reliable maximum that Bendix could use now.

Two markets which formerly appeared to be lucrative are being "played by ear," according to Rice. These are DMET and the radar transponder beacon. Uncertainties of airline interest in DMET are being watched closely before making firm production plans. Beacon work is "indefinite," Rice said, because confidence appears to be lacking in the technical performance of the system.

The company plans to market a "poor man's DME." This is a small, 5-lb. range-measuring device that extracts distance information from any



FIRST ILLUSTRATION of new Bendix 3-D "Rapier" radar being proposed for updating U.S. SAGE air defense capability. Radar uses Sanders Associates' PANAR technique.

existing two-way voice link.

It operates on a cooperative basis. An interrogator station initiates the distance-measuring cycle when it transmits a closely controlled audio tone via the communications channel.

The transponder station responds on the same RF frequency with a tone signal that is identical in phase with the received signal. This return signal is phase-compared by the interrogating station with the signal it originally transmitted.

The phase difference is proportional to the distance and the distance is read on a meter. Tests of the NVA-203A DME show an accuracy of one to two miles over a 100-mile range.

Specifications for a transistorized version of the system call for a size of  $7\frac{1}{4} \times 6\frac{1}{2} \times 10\frac{7}{8}$  inches. Power required would be 26.5 volts at 0.4 ampere.

The equipment could be used by small planes in conjunction with VHF equipment, rescue aircraft, landing operations or by ground forces for unit-to-unit distance.



## WEST COAST TALK

by Fred S. Hunter

### Winning WS-110A competition big boon for North American, but Boeing is likely to share in actual production

LET'S TALK ABOUT the WS-110A and the winner, North American Aviation—winning this competition was quite a shot in the arm for the Los Angeles division, which had been fast losing its place as NAA's biggest and most important division to Rocketdyne. Latter, of course, will keep right on shoving toward the top spot in the corporation's business volume, with its production of missile engines for the Atlas, Thor and Jupiter, but now the Los Angeles division has the opportunity for a great comeback on the aircraft side.

Although Boeing came out on the loser's end in the WS-110A competition, it could eventually cash in on a substantial portion of the business. Even before NAA was announced as the winner of the prototype award, rumors were around that the Air Force was flirting with the idea of a split between the two companies in production of the bomber, with each being given certain areas of manufacturing responsibility. This would seem to be a logical procedure. The WS-110A will be about a \$20-million airplane, and thus offer the opportunity for wide-scale subcontracting. Moreover, both NAA and Boeing are fine companies, important to the U.S. defense and their future economic welfare is most important to the military. In the event there is production on the WS-110A, NAA will get the bigger share, but don't be surprised if a division of around 60% to NAA and 40% to Boeing is worked out.

As presently contemplated, the WS-110A will be powered by six General Electric J93 turbojet engines designed for lower pressure ratios for high-altitude efficiency. An alternative powerplant might be Pratt & Whitney's J58, a medium-pressure-ratio turbojet developed for the Navy, but having a bigger airflow than the J93. Originally, NAA designed the WS-110A for a low-pressure-ratio turbojet proposed by Allison, but changed over when the Air Force gave the nod to the GE engine, then known as the X279. The WS-110A fuel will be JP-6, a widecut kerosene possessing thermal stability and providing better combustion energy at altitude than JP-4. In the progress of the aircraft, HEF-3, a boron chemical compound, will come into the picture,

but would be for use in the afterburner only.

On the day NAA was announced as winner of the WS-110A competition, the corporation's stock reacted with a two-point rise and tipsters were out with the word: "It will mean millions." It won't, of course, unless there is a production order. Research and development projects of themselves, including prototypes, aren't very profitable. Their value is in the production to which they may lead. General feeling within the industry is that NAA later on will get a production order. This is predicated not only on the fact that we will continue to need manned aircraft in the big bomber class, but on new design values developed by NAA to accomplish high Mach performance in combination with long range. These, incidentally, may very well help hasten the day of the supersonic transport for the airlines.

Now, change planes—Lockheed has its brains department trying to figure out a topnotch slogan for the Electra—like the Britannia's "Whispering Giant," which Lockheed wishes it had thought of first . . . Convair is reported working on developments for higher altitudes for the F-106 . . . Hughes Aircraft's Ground Systems division has delivered prototype units of the completely new, portable MSG-4 aircraft detection and tracking system for use with Nike and Hawk missiles to the Army at Fort Bliss . . . The Flying Tiger Line has signed up with the New York Port Authority for 18,000 sq. ft. of space in the new air freight terminal at Newark to be ready in July, 1959, showing how air freight continues to grow . . . Some airline planners are wondering if it is going to be possible to serve hot meals in the new jet transports on the same scale as today's DC-7s and Super Constellations, or if a new type of food service aloft—such as passing sandwich platters—isn't going to have to be adopted, because of the shorter time of trips combined with larger passenger loads.

Lear, Inc.'s sale of its Geneva operation is not to be taken as an indication it may also dispose of its Munich facility. Latter is showing a profit and as long as this is the case Lear will continue it.

## New magic date on airline fares: Feb. 15

*On that date CAB may grant higher fares without waiting for final verdict in investigation*

by William V. Henzey

THE DOMESTIC airline industry's financial crisis will come to a head before Feb. 15. By that date the industry will know whether the Civil Aeronautics Board will grant immediate relief in the form of higher passenger fares or whether the entire matter must await final decision in the General Passenger Fare Investigation approximately one year from now.

There is one other possible alternative—another interim emergency fare case with a statutory 180-day time limit—similar to last year's so-called 6% case.

Feb. 15 becomes the key date. Continental Air Lines has filed a tariff to become effective on that date which would increase CAL's fares 15%.

CAB must either approve the tariff—in which event similar increases for the remainder of the industry would follow—or CAB can suspend it and start a new 180-day interim investigation.

At presstime it appeared certain the other 11 trunk lines would file either specific tariffs or proposals under which CAB could act much sooner on the industry's problems than

the current GPFI will permit.

Encouraging for the industry at this point is the fact that CAB is expressing active concern in the matter. In mid-January the agency took the unprecedented step of requesting all trunk airlines to furnish year-end financial results immediately.

Statutory reporting period for such data is 90 days. In this case, 1957 results would not have to be filed until April 1, 1958. The CAB request illustrates the urgency which most Board members attach to the situation. CAB has set Jan. 31 as the deadline for airline compliance.

Unique in the Continental filing was the proposal to time the fare increase to the General Passenger Fare Investigation. CAL's increase would expire 30 days after final decision in the investigation. Fares would then be adjusted to reflect terms of the CAB's ruling.

In proposing the emergency increase Continental president, Robert F. Six, says the decision in the investigation is too far away to help the industry, whose problems have mounted steadily for the past year. Even a ruling within a month by CAB is considered "too late" by some

carriers. But the industry is unanimous that further delay will be disastrous.

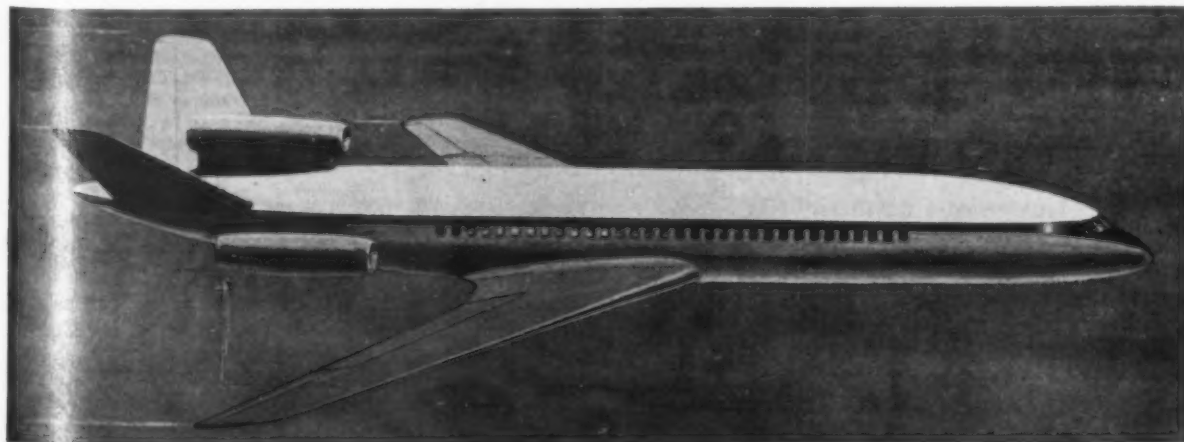
The GPFI was launched in May, 1956. It was, because of its comprehensive scope, slow in getting off the ground. It was sidetracked completely last spring when seven carriers said they couldn't wait for fare relief and proposed an interim increase of 6%.

Only one member, vice chairman Chan Gurney, saw the urgency of the carriers' plea. New member, Louis J. Hector, appeared to be in the middle. He expressed concern but was not satisfied that the airlines had submitted sufficient data to back up their pleas.

Chairman James R. Durfee—who was under considerable Congressional pressure from the day he took office—voted against the 6% increase on the grounds the issue would be more thoroughly explored in the GPFI. He was joined by Member Harmar D. Denny (also under Congressional pressure) and Member G. Joseph Minetti.

Much of the industry's hope now rests on Chairman Durfee who has a vast store of knowledge in the public utility field and has been instrumental in urging the carriers to

### British jet transport has three rear-mounted engines



AVRO 740 JET TRANSPORT, competing with Bristol 200 and de Havilland DH 121 in British European Airways' design contest, has three rear-mounted engines. All three aircraft will be powered by a smaller version of the Rolls-Royce Conway bypass engine. BEA's order will be for about 20 aircraft. If Avro 740 is chosen, work will be shared with Bristol. Reciprocally, Bristol will subcontract work to Avro if Bristol 200 is selected.



submit 1957 financial results as soon as possible.

Hector's desire for more detailed information before ruling in favor of the carriers last summer would appear to be more than satisfied by the voluminous oral and written material sponsored by top leaders in the

banking and investment worlds since hearings in the GPFI opened last Nov. 18.

In short, there are strong indications a majority of the Board looks on the situation as critical enough now to warrant immediate action.

## CAB aims to reduce number of airlines operating between U.S. and Alaska

Civil Aeronautics Board has instituted an investigation aimed at reducing the number of certificated airlines now operating between the U.S. and Alaska. At the same time, the Board said it would prefer that the carriers involved work out agreements for "consolidation, merger, route transfer, or the like."

Four lines affected are Pan American World Airways, Northwest Airlines, Alaska Airlines and Pacific Northern Airlines. The total subsidy requirements for States-Alaska operations, CAB said, "show no signs of any substantial decrease in the foreseeable future." Actually, PAA and Northwest are not subsidized but CAB said "this does not necessarily mean that their States-Alaska operations are economically sound."

In instituting the investigation, CAB referred to President Eisenhower's statement last August, when he signed the bill granting permanency to Alaska and PNA, "that the number of States-Alaska carriers is excessive, and that re-

duction of this number is essential in the interest of strong competitive air service between the U.S. and Alaska."

Specifically, the new CAB case will be to determine if the public convenience and necessity require it to: (a) reduce the number of carriers and (b) integrate the present separately certificated overseas routes of the States-Alaska carriers or any combination of these routes, into a unified route system or systems which would provide air transportation over one or more routes including both Fairbanks and Anchorage and points in the States, and between Anchorage and Fairbanks.

Board said it would prefer voluntary merger agreements and "stands ready to give prompt consideration to any such agreement or agreements that may be submitted. However, the Board believes that the problem to be met is of such pressing importance that it cannot, on the mere possibility that voluntary agreements may be submitted, further defer setting in motion a formal proceeding . . ."

## LAA to continue flying S-55 copters

Los Angeles Airways, Inc., has reiterated its decision to continue operations with its current fleet of S-55 Sikorsky helicopters until such time as the twin-engined S-61 is available to civilian operators.

Although the twin-turbine, five-bladed rotor aircraft is still under Navy security wraps, it is estimated that commercial transport models will be ready for delivery in 1959-1960.

Anticipating a passenger capacity of 20 or more with the S-61, LAA has predicted that the new equipment will enable it to attain self-sufficiency sometime after 1964.

During LAA's hearing for a certificate renewal, the S-61 was shown to be capable of cutting en route times as much as 16 minutes on the carrier's longest route. However, it is believed that the delivered version will have greater performance than originally estimated.

Although LAA does not furnish a passenger service to the downtown Los Angeles area at present, use of multi-engined equipment would make this feasible.

LAA has conferred with the CAA and architects for the Los Angeles

Civic Center concerning roof-top loading requirements.

Said to have a gross weight of about 16,000-18,000 lbs., the S-61 is not expected to prove a problem for roof-top operations.

## Comet thrust-reverser



DE HAVILLAND development aircraft for the new Comet jet transport has been fitted with Rolls-Royce thrust-reversers on its two outboard Avon engines. Here John Cunningham, D-H chief test pilot, inspects installation.

## CAB to speed hearings on N.Y.-San Francisco case

Civil Aeronautics Board has ordered expedited hearings on American Airlines' application for New York-San Francisco nonstop service. Board split 3-2 on the issue, with the majority emphasizing the case provides an opportunity for the "first full-scale investigation of the imminent impact of the operation of jet aircraft in a market of the size and importance of that involved here."

Vice Chairman Chan Gurney and Members G. Joseph Minetti and Louis J. Hector formed the majority. Chairman James R. Durfee and Member Harmar D. Denny dissented "reluctantly."

The new proceeding will be limited solely to the issue of nonstop service between New York/Newark and San Francisco/Oakland. Trans World Airlines and United Air Lines currently operate such nonstop service. American, though serving the market, is required to make a stop at Chicago.

Durfee, on the short end of a CAB vote for the first time, and Denny said "the needs of San Francisco were given exhaustive consideration in the relatively recent Denver Service Case . . . We wish to emphasize that we would like to join our colleagues in this instance and to give immediate consideration to the pleas of any community that feels it needs more air service, but the Board simply does not have the physical resources necessary."

## ALPA and National sign first jet pilots' contract

National Airlines and the Air Lines Pilots Assn. have signed this nation's first jet transport pilots' contract. It makes the fourth long-term labor contract to be signed by the airline in the past three months, flight dispatchers, ground personnel and flight engineers having previously signed agreements.

Under terms of the new contract, pilots on National's Lockheed Electra projects and Douglas DC-8 jets will be paid from \$22,000 to \$26,800 a year. A senior DC-8 captain will gross \$2,234 per month, for example, while the captain on an Electra will be paid \$1,900 and the ranking pilot on the DC-7B will gross \$1,800.

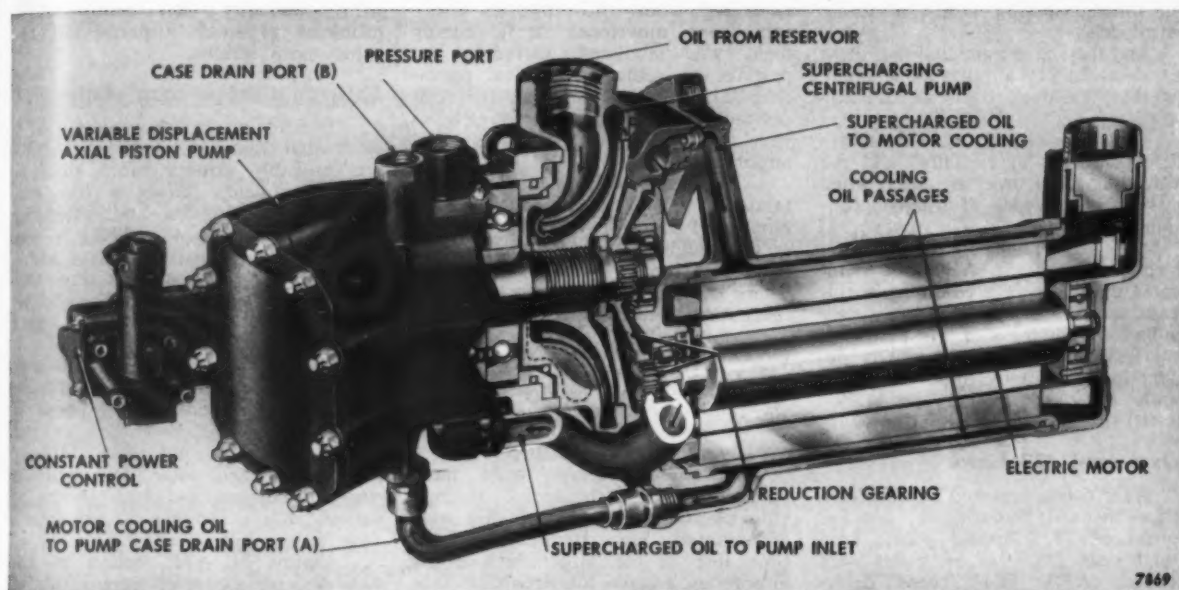
All figures are based on 85 hours monthly.

Included in the agreement, in addition to provisions for improved working conditions, are monthly increases of \$100 to \$150 per month for senior captains flying present aircraft, with proportionate increases for all other captains and co-pilots.

The part of the contract covering piston-engine aircraft runs until Dec. 1, 1959, while jet transport pilots are covered until Dec. 1, 1960.

# New Vickers OIL COOLED Motorpump

## For Continuous Duty Applications



### Installed weight approximately 25% less; also offers significant size reduction

The 12 horsepower oil cooled motorpump shown above weighs 31½ lb and is 20" long overall . . . motor diameter is less than 4". This represents a substantial saving in weight and size over the conventional air cooled motorpump. Also, there is a further saving with the elimination of duct work in the airframe normally required for air cooling the electric motor. The motorpump illustrated is now in quantity production for turbine powered transports.

The time-proven Vickers variable displacement piston type pump, which is an integral part of this "package", delivers up to 8 gpm at 2250 psi, reduces to 6 gpm at 2950 psi and zero flow at 3000 psi. These flow and pressure combinations (8 to 6 gpm range) provide constant horsepower for a variety of flight operating requirements. It is designed for 2000-hour service.

A centrifugal boost pump is located between the pump and the 400 cycle, 200 v electric motor; in addition to supercharging the pump, it circulates oil through the double-walled motor casing. Cooling oil from the motor jacket is discharged into one case drain port (A) . . . then out port (B) to a heat sink. At full pump flow, the impeller provides 2 gpm to the motor casing.

The 12 horsepower unit described above is typical of the Vickers motor and pump combinations now available to the aircraft industry as "packaged power" for continuous duty applications. Remarkable records for reliability in

both military and airline service have been established by Vickers designed motorpumps.

#### Higher Overall Efficiency

Overall motorpump efficiency (hydraulic power output to electric current input) is 75%. This is possible only because Vickers Piston Pumps have an overall efficiency of 92%. The more efficient pump means the use of a smaller, lighter electric motor, minimum heat transfer to the hydraulic circuit, and less current drain.

#### Heat Rejection Control

The oil cooled motor design offers a definite advantage in that heat dissipated (140 Btu per minute, maximum) can be conveyed readily to a remotely located heat sink. This is one reason why optimum performance for a given weight and size is more readily achieved in a liquid cooled unit.

#### High Altitude Operation

Motor operation is not affected by low air density since it is not dependent upon air cooling. Inclusion of centrifugal boost pump prevents piston pump cavitation above 30,000 ft, even though reservoir is vented to atmosphere.

#### Constant Power Control

The constant horsepower control shown on the above unit is optional, depending on the application. The control maintains constant 3000 psi pressure as flow increases until the electric motor is loaded to its maximum horsepower. Additional flow is then available at reduced pressure to maintain the same

horsepower load on the motor. This type of control is particularly advantageous for low force, high capacity (flow) and high force, low capacity applications while staying within the limits of recommended electric motor load ratings.

#### Packaged Unit

The axial piston pump, centrifugal boost pump, reduction gear and electric motor are all integrated into an exceptionally compact and high-performance package. This concept also permits a high degree of design flexibility to meet individual requirements.

#### Sound Insulated

Because air ducts are not needed to dissipate motor heat, the oil cooled motorpump can be sealed in a compartment and effectively sound insulated.

#### Additional Advantages

Low frictional starting torque characteristics of the 12 horsepower unit permit acceleration to maximum speed in less than 200 milliseconds. The electric motor meets the military specifications for explosion-proof operation.

For further information contact the nearest office listed below.

### VICKERS INCORPORATED

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JANUARY 27, 1958

Circle No. 14 on Reader Service Card.

# ATC delays cost airlines \$5.8 million a year

FOR THE FIRST TIME, the U.S. airlines have pinpointed the causes of their time-consuming, costly air traffic control delays.

And they have estimated that these delays—at 24 key airports alone—may be costing them as much as \$5.8 million a year.

They discovered that "runways and/or taxiways at capacity" was the greatest single source of delay when considering all types of weather conditions.

The Air Transport Association, which conducted the study, said it indicates that "if traffic continues to increase annually at a rate which is only one-half or one-third of the past year . . . U.S. airports will be wholly deficient in their ability to meet the demands of civil aviation during the next 10 years."

## Delays total 423 hours

ATC delays reported by scheduled airlines in the U.S. during the first five months of 1957 totaled 3,241, even though only 2½% of all flights were checked, ATA said. These delays totaled more than 423 hours.

In the extreme, and if the 2½% sample were 100% accurate, this would mean there were 129,640 delays totaling 16,920 hours in the first five months of 1957. ATA, however, does not consider the sample to be nearly that accurate.

Accurate or not, the study furnishes the first information that can be used to correct the more troublesome aspects of the delay situation.

In the study, which covered the period from February, 1956 through

May, 1957, arrangements were made to "follow" every 40th airline flight departing from 160 airports. Every subsequent movement of a survey flight was tabulated, including departure, en route and arrival operations at every airport, even though not among the original 160. Flights were followed through more than 500 airports.

The 3,241 delays came from a total of 60,000 reports in the five months of 1957. This does not mean 60,000 flights, because there could be two or three reports on one flight. There were 192,000 reports during the entire 16-month period.

## Other problems

In addition to the runway-taxiway problem, the survey showed:

1. Delays occurred most frequently to departing flights.

2. Arrival delays were more severe from the standpoint of individual lapsed time, although they were encountered less frequently. Total time lost at the larger high-density airports is greater for departure than for arrivals.

3. Delays in en route flights were about equal to arrival delays in terms of frequency, but were less severe in terms of time lost.

4. Difficulty in obtaining necessary ATC clearance was attributed to lack of adequate communications at some locations and to lack of unoccupied routes or altitudes at others.

5. Airport departure delays are increasing, even during good weather.

6. Total traffic at 24 key airports increased 19% during the study;

airline traffic was up 18%. Increasing traffic can be expected at all airports, with possibility that minor ATC problems at small airports will become more serious.

## LaGuardia delays most costly

In studying 24 key airports, ATA discovered that delays at LaGuardia are probably costing more than at any other field. Taking a 10-month period at LaGuardia and extending the 2½% sample to 100%, it was concluded that departure delays added 3,574 hours to airline flight time.

Arrival delays contributed an additional 1,614 hours, for a total of 5,188.

These hours, at the industry's average direct cost per flight-hour, mean an added operating expense of \$1,245,000 a year.

A close second was Midway Airport, Chicago, with 3,193 hours of departure delays, and 1,667 hours of arrival delays, adding \$1,166,400 a year to the bill.

Causes of ATC delays at LaGuardia, for example, were identified as:

No ATC clearance, 28.9%.

Runways/taxiways at capacity, 56.7%.

Preferential runway refused, 3.4%.

Airway congestion, 5.1%.

Undermanned facility, 1.7%.

Other, 4.2%.

These reports covered good and bad weather. ATA, knowing that ATC does not operate all the time, conceded the figures might be misleading.

It made an "educated guess" that ATC is required 15% of the time; asked its statisticians to apply an arbitrary weighting factor to the figures, and came up with these LaGuardia results, which assume that ATC was in operation 100% of the time:

No ATC clearance, 54.8%; runways/taxiways at capacity, 17.9%; preferential runway refused, 6.4%; airway congestion, 9.6%; undermanned facility, 3.2%; other, 8.1%.

The fact that both good and bad weather operations were included in the study brings down the overall average delay sustained, ATA emphasized.

"For example, the average departure delay for all flights during the winter of 1956 at 24 selected cities was approximately .4 minute.

"During the winter of 1957, this average increased to .8 minute. These are the average delays as shown by the survey, yet substantial numbers of flights incurred actual delays up to 30 minutes or more. The importance is the trend of departure delays and their relationship to arrival and en route delays."

## New markings for Pan American's fleet



A BLUE GLOBE with "Pan Am" lettered in white on the vertical tail highlights the "new look" for Pan American World Airways' fleet. Other markings, as shown on this Boeing 707 which joins PAA next year, includes white fuselage with light blue striping. Airline's present fleet of 141 piston engine aircraft is now being repainted in the new colors.



## TRANSPORT TRENDS

**Hidden feature of the new government-guaranteed loan law** is that it should result in subsidized airlines getting prior CAB approval of an airplane. With CAB first okaying the loan, risk of an airline buying a new plane and later having the Board refuse to underwrite its operation will be minimized if not wiped out entirely.

**Heavy trading in Capital Airlines stock has caused speculation** that a group or groups may be trying to gain control of the company. Nothing definite is known, but brisk sales have upped the share price of the financially-strapped airline by \$4 in the past few weeks.

**Immediate cause of the Carter Burgess-Howard Hughes blow-up in TWA** was a \$14-million jet overhaul base which Burgess insisted be planned and built at once. Hughes wanted to delay the project for awhile, preferred to let Pratt & Whitney take over jet engine overhaul under contract. Known for his low boiling point, Burgess not only flatly disagreed but demanded immediate action and said he would resign forthwith. Hughes asked Burgess to remain for awhile, but latter refused and quit on short notice.

Meanwhile, Hughes' problems are piling up. Not only is he without a president, but his TWA equipment commitments are now set at a staggering \$390 million. There is more than a little concern being felt in some quarters.

**CAB's new investigation and call for mergers** in States-Alaska market focus attention on reports of preliminary talks between Alaska Airlines and Pan American. One possibility reported is that PAA might dispose of its Alaskan routes in a sale to Alaska Airlines.

**If CAB approves TWA's proposal to fix all domestic first-class fares** at 6.7¢ a mile (see page 55), company's passenger revenue would rise about 5.9%. If other lines adopted the same idea, revenue increases would range from a low of 0.6% for Delta to a high of 8.5% for Capital. But four different fare levels have now been proposed to CAB by airlines and still more will follow. This leaves eventual solution for a uniform fare change, if any, up to CAB.

**Look for Bonanza Air Lines to exercise its option** on three more Fairchild F-27 turbo-prop aircraft. It will also order bigger RDa 7 engines for all six planes. BAL's original three-plane order contemplated RDa 6s.

**The Administration doesn't plan an "expedited" mail program** if Congress okays its request for a 5¢ postage rate on all non-local first-class mail. Under an expedited plan, first-class rate would be 5¢, air mail would be abolished, and mail would move by air or surface, whichever was more expeditious. However, Administration's move is merely a revenue-producing measure, contemplates no big change in mail service. But there are indications that some legislators may not go for an increase in price unless the public is given better service.

**Target date for subsidy-free helicopter operations: 1965.** That's the way New York Airways officials see it now. But their estimate is based on availability by 1960 of "Ship X," a twin or multi-turbine helicopter carrying 20-25 passengers up to 125 miles. Daily operation of 5- to 10-helicopter fleet would involve upwards of 250 landings, almost 3,000 flight miles compressed within 25-mile radius of New York. Subsidy would drop from 1960 peak of \$2.2 million to \$1.3 million in 1961, \$690,000 in 1962, and disappear by 1965. Ship X would cost about \$500,000.

## TRANSPORT At Deadline

### Airline spokesmen oppose Air Force plan to lend planes to build up Civil Reserve Air Fleet

A generally unfavorable welcome from witnesses greeted Air Force's proposed "bailment" plan in hearings before the House Subcommittee on Military Operations.

Following the lead of Stuart G. Tipton, Air Transport Assn. president, several witnesses told Rep. Chet Holifield's (D-Calif.) committee that the plan, under which AF planes would be flown and serviced by civilians, serves to reduce the airlines to hiring agents and would not build up a Civil Reserve Air Fleet.

The solution most often suggested was that MATS get out of competition with the commercial airlines and let the carriers use military contract profits to build up their fleets to the wartime needs of the country. Government and taxpayer savings in this sort of operation, according to Thomas Wolfe, former Defense Dept. director of requirements, procurement and distribution, would run into billions.

Airlines witnesses emphasized less-expensive commercial carrier operation, as opposed to the military.

David W. Bluestone, former Defense Air Transportation Administration official, suggested that these savings be plowed back into CRAF. He cited the existing shortage of heavy

cargo planes in the present CRAF program.

Raymond A. Norden, president of Seaboard & Western Airlines, recommended that action be taken to limit the size and number of MATS planes and urged creation of "a nucleus military airfleet of specialized aircraft appropriate to its wartime mission."

Tipton's was one of the most comprehensive plans offered. He proposed a nine-step program for an optimum CRAF. His plan would give the airlines all of the government cargo they could handle and keep MATS in the status of immediate reserve.

#### Estimate of needs required

Tipton called for an estimate of both civil and military needs in wartime. This estimate would be balanced with actual capacity to lift goods. The difference, or airlift deficit, would be made up with a reserve of Air Force planes. In Tipton's plan, the lending of AF planes would be the last resort.

Flying Tiger Line president Robert W. Prescott stressed the adverse effect the AF plan would have on the aircraft industry. Speaking of his airline, Prescott said "we . . . planned to acquire a fleet of DC-10s. If the bailment plan is effected, plans for acquisi-

tion of this fleet will be scrapped." Prescott also warned against "loss of potential modern airlift capability for the national defense."

Another strong objection to the AF plan came from James Horst, of the Air Transport Div., Transport Workers' Union, AFL-CIO. Horst claimed the plan meant salary cutbacks for his union's members, and that they would be required to fly in combat areas with no additional compensation. Another union representative, Clarence Sayen, president of the Airline Pilots Assn., asked the committee for a permanent roster of pilots to be used in an emergency.

Delos Rentzel, board chairman of Slick Airways, proposed an advisory committee to the President, under the National Advisory Committee for Aeronautics, and charged with designing a new all-cargo plane to be used in the CRAF program. Rentzel went on to say that military air traffic was resulting in civil carriers' development being "thwarted." Also critical of civil traffic lost to MATS, Logair and Navy's Quicktrans was Maj. Gen. John P. Doyle, executive director of Independent Airlines Assn.

Said Doyle: "If MATS needs us in a D-Day situation, as it surely does, then it needs us now . . . for unless our aircraft utilization rate is stepped up, chances are a number of carriers will be out of business when the whistle blows."

### CAB acts against six trunks on 'unrealistic' scheduling

CAB's Office of Compliance instituted enforcement proceedings this month against six major domestic trunk airlines for "filing and publishing schedules which are not reasonably accurate and do not bear a realistic relationship to actual performance."

Named as respondents were American Airlines, Capital Airlines, Delta Air Lines, National Airlines, Trans World Airlines and United Air Lines.

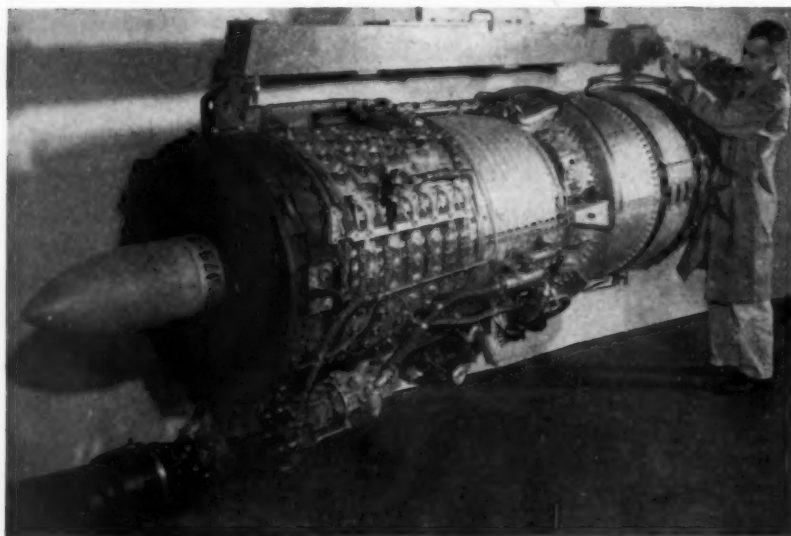
Enforcement complaints are based on surveys of specific flights operated by the lines in the months of July, 1956 and April, 1957. In the case of American, for example, eight transcontinental schedules were tested and, for the July, 1956 month, the CAB office said "the percentage of completion within scheduled arrival time . . . ranged between a low of 6.4% and a high of 70.3%."

Similar references to certain flights of the other respondents were also cited.

Complaints were not filed under CAB's new and controversial "realistic scheduling" regulation which requires a 75% completion of flight schedules. Instead, they were advanced under Sec. 411 of the Act, dealing with "unfair and deceptive practices" and Part 231 of the Economic Regulations which requires the filing of all schedules.

Carriers have until February 7, to answer the complaints.

### Convair 880 powerplant passes acceptance test



GENERAL ELECTRIC'S CJ-805, commercial version of the J79, has passed its 1,000-hr. endurance trials after simulating 600 individual airline flights. Flight distances simulated ran from 375 to 1,235 miles. The CJ-805 will power Convair's 880.

## American asks CAB to end passenger fare investigation by May or June; seeks immediate 15% increase

American Airlines asked the Civil Aeronautics Board last week to adopt procedures under which the General Passenger Fare Investigation could be brought to an end by May or June. Simultaneously, AA notified CAB it would file for an immediate 15% increase in fares and four other carriers either filed or took steps to file new fare tariffs.

Action came subsequent to Continental Air Lines' proposal to increase fares by 15% effective Feb. 15. (See page 49.)

Trans World Airlines filed new tariffs to become effective March 1, which emphasize a change in "fare structure" as opposed to proposed changes in the "level" of fares. TWA would adjust all domestic fares to reflect a 6¢ per mile rate for first class service and a 4.7¢ per mile rate for tourist.

About 12% of TWA's 1290 domestic fares would be reduced under the proposal; the remainder would be increased.

The airline emphasized the filing was not a substitute for fare increases involved in the GPFI.

At press-time, Eastern Air Lines and Delta Air Lines had issued instructions to their tariff agent for tariffs which would increase fares by 12½% and also add \$1 to each fare. Also, Braniff Airways had issued instructions for a 12½% fare boost with all fares rounded to the nearest half-dollar. Effective date for those filing was not determined at press-time.

Meanwhile, American suggested three steps under which the Board

could bring the GPFI to conclusion some nine months before its expected termination date. Hearings have been in progress since Nov. 18, 1957. At the present pace, the case isn't expected to be decided until February or March, 1959.

First step advanced by AA is for CAB to instruct its staff and the Examiner to "take every possible step toward bringing the hearing to an end within one month after close of the 'rate of return' phase." That would mean hearings would be ended by about March 1.

AA then suggested that CAB direct that the case be certified directly to it for final decision. As a third general step, AA proposed that briefs be filed by all parties within two months after the close of the hearing and that the case be set for argument immediately thereafter.

In suggesting shortened steps, American said the "rate of return" phase—the first of three phases of public hearings in the GPFI—"has been fully explored in a wealth of exhibit material, written testimony and meticulous cross-examination by attorneys for the Board's staff. The question of the allowable or needed earnings for a regulated enterprise probably has never received such full treatment as in the testimony and exhibits in this case."

Noting an anticipated conclusion to the GPFI in May or June, American said CAB should not suspend its proposed new 15% increase tariffs. Otherwise, the carrier pointed out CAB would be committed to another 180-day emergency investigation.

operation next year.

Having a top speed of more than 600 mph, the new jetliner will be able to carry a 33,000-lb. gross payload, which includes 130 tourist-class passengers, over a maximum range of 2,500 miles. Best cruise altitude is between 15,000 and 40,000 ft. For ranges down to 150 miles, profit-making operations with the 720 are still feasible, according to Boeing.

Company project engineer Fred A. Maxam says that the new jet has "a lower break-even load factor than any other intermediate-range airliner, including those with reciprocating engines and turboprops."

Last month, United Air Lines signed a \$39.7-million contract for eleven 720s, which makes this company the first to buy the aircraft. Price tag

## Technical data— Boeing model 720

### Dimensions

Overall length	134'6"
Wing span	130'10"
Wing area	2,433 sq. ft.
Tail span	39'8"
Overall height	38'7"
Body length	128'10"
Body width	12'4"
Body height	14'2½"
Tread, main landing gear	22'1"
Wheelbase	47'4"

### Passenger capacity

Standard (5 abreast)	110
Combination (5 and 6 abreast)	123
Tourist	149

### Cargo capacity (cu. ft.)

Forward hold	500
Aft hold	735

### Weights (lbs.)

Normal takeoff	185,000
Takeoff gross, max.	202,000
Landing	165,000
Operating weight, empty	103,145
Revenue payload	32,855
Normal fuel space (10,092 U.S. gals.)	65,600
Max. fuel space (13,478 U.S. gals.)	87,600

for basic airplane is \$3.4 million. Delivery of first one is scheduled for April, 1960.

Externally, the airliner is identical with the 707 Jet Stratoliner ordered by Qantas Empire Airways, Ltd., but weighs 45,000 lbs. less because the fuel load is reduced. This leads to a smaller aircraft structural weight and a lighter landing gear.

Four improved and lightweight JTC3 (J57) engines located in strut-mounted nacelles suspended below and forward of the wing leading edge power the 720. This combination of lower weight and higher-performance engines gives the airplane a sea-level takeoff run at normal gross weight of only 5,400 ft. for conditions specified in CAA regulations.

The fuselage is designed to withstand a sea-level cabin pressure up to

## Boeing announces performance details of its 720 short-to-medium-range 130-passenger jet

To fulfill its announced goal of giving the airline market a complete family of jet aircraft able to operate profitably in any transport area, the Boeing Airplane Co. has revealed the performance and design characteristics of its newly developed short-to-medium-

range Boeing 720.

The other two members of this family are the 3,500-nautical-mile-range 707 Jet Stratoliner, now in production and scheduled for delivery this year, and the 5,000-nautical-mile 707 Intercontinental, destined for airline



BOEING 720, newly designed short-to-medium-range jetliner, is shown wearing colors of its first buyer, United Air Lines. First 720 is to be delivered in April, 1960.



22,500 ft. altitude, and a pressure differential up to 8.6 psi above 22,500 ft. Extra members called "tear stoppers" have been used throughout the body to prevent the spread of any incipient structural damage.

Under normal flight conditions, the internal balance built into the primary surfaces keeps stick forces low and the pilot has no need for auxiliary power boost. The hydraulic system uses Skydrol 500 at an operating pressure of 3,000 psi. The 720's landing gear will "free fall" for emergency extension and is then manually locked. The nose gear is steerable, and retracts forward into a well under the control cabin.

## New financing company names Povey vice president

Leonard J. Povey has been named executive vice president of the recently-formed Aircraft Acceptance Corp. and Aircraft Exchange Corp., Ft. Lauderdale, Fla. Povey, a 35-year veteran in aviation, had been executive vice president of Mackey Airlines since 1952.

Aircraft Acceptance Corp. has been formed to provide fixed base operators, dealers and distributors in the southeast U.S. with "time sale financing, equipment and service financing with special emphasis on time sale financing of all new and used aircraft," according to president J. A. Harrington.

Aircraft Exchange Corp., an affiliate, will buy and sell used aircraft. It will also build hangars, warehouses and office space on a leased 10-acre tract at Broward County Airport, Ft. Lauderdale.

## Three new firms describe anti-collision proposals

Two new proposals for anti-collision systems and a collision data-processing system were presented to an Air Transport Assn. meeting on proximity warning and collision avoidance in Los Angeles.

Dr. J. B. Thatcher, Minneapolis-Honeywell, Aeronautical Div., told of his company's studies on a dual-mode infrared system which operates in either self-sufficient or cooperative modes.

In the cooperative mode, the M-H system would require other aircraft to carry infrared beacons. These might be coded to convey altitude, velocity or bearing information deemed necessary to success of a collision-avoidance scheme.

In the self-sufficient mode, the system would merely indicate proximity of other aircraft and would be subject to range and position information limitations regarded as inherent in simple infrared systems.

Another proposal based on use of existing weather radar installations was made by Federal Telecommunication Laboratories. A self-contained collision-avoidance system, it would receive radar signals from a 90-degree sector

area in front of an aircraft.

To provide the accurate bearing information deemed necessary for a collision-avoidance system, the FTL plan calls for four interferometer-type antennas to obtain rate of change in an intruder's bearing.

After bearing and velocity rate information is received it would be processed by a computer and displayed on a radar scope. A radar "blip" would show position of the threat. An arrow, varying in length to show seriousness of threat, would indicate course to safety.

Packard-Bell Electronics Corp. reported a new bearing evaluation device, designated "CONBEV," which is designed to take information from an IR scanner and process it for collision warning.

## Pierson takes over as acting president of TWA

Warren Lee Pierson, board chairman of TWA since 1947, has been named acting president of the company, filling the vacancy created by resignation of Carter L. Burgess. Pierson will retain the board chairmanship.

Burgess resigned Jan. 1 because of "disagreement over airline policies" with Howard Hughes, president of Hughes Tool Co., which owns 77.6% of TWA's stock.

## BOAC places \$168-million order for 35 VC.10 jets

Vickers-Armstrongs (Aircraft) Ltd. and British Overseas Airways Corp. have signed a \$168-million contract for 35 Vickers VC.10 jet airliners with an option for 20 more. Last year BOAC announced its intention to place an order for VC.10s for use on British Commonwealth routes. Since then developments in the design of the aircraft and in the power available from its

## BRIEFS

Trans Caribbean Airways ordered a Douglas DC-8 for use on its recently-awarded New York-Puerto Rico route. Delivery of the plane, which will be of 176-passenger "economy class" configuration, will take place in December, 1960. Trans Caribbean also has three DC-6As on order and expects to have them in service about Mar. 1.

CAB reported that unscheduled air carriers completed their second straight year of operations without a passenger fatality.

CAB has eliminated regulations governing the carrying of landing flares on transport aircraft in all cases except in extended night overwater operations. Infrequency of use and fire hazard of the flares were cited as reasons for the change.

Finnair, Finnish flag carrier, has ordered three Caravelles and optioned three more. Deliveries will be made February-April 1960. Order brings Sud-Aviation sales of Caravelles to 23, options to 37.

Dr. Rudolf Heberlein, chairman of the board of Swissair since 1951, died in Wattwil, Switzerland, of a heart attack.

Riddle Airlines re-sold the Douglas DC-6A freighter it had on order to Hughes Tool Co.

aircraft will be delivered to BOAC in 1963. The aircraft is being financed entirely by Vickers.

The VC.10's key design feature is its airfield performance. Vickers says it is to have "outstanding takeoff performance, especially from the high-altitude and hot-weather runways which normally impose severe limitations on the payload and profitability of a jet."



four Rolls-Royce Conway engines have persuaded BOAC to use the VC.10 on the North Atlantic as well as on Australian, Far Eastern and African routes.

Vickers says the VC.10 will be Britain's first pure-jet airliner for use on the North Atlantic route, and that it will have a better all-round performance than any competitive jet so far announced. First VC.10 is due to fly in late summer of 1961. A fleet of the

The VC.10 is the first long-range aircraft to go into production with four engines mounted at the rear of the fuselage.

The VC.10 will have a "double-bubble" fuselage with a top passenger-deck capable of carrying up to 152 passengers in extra high-density seating, up to 135 in standard high density, or 108 in a first-class arrangement. Underfloor cargo capacity is substantial.

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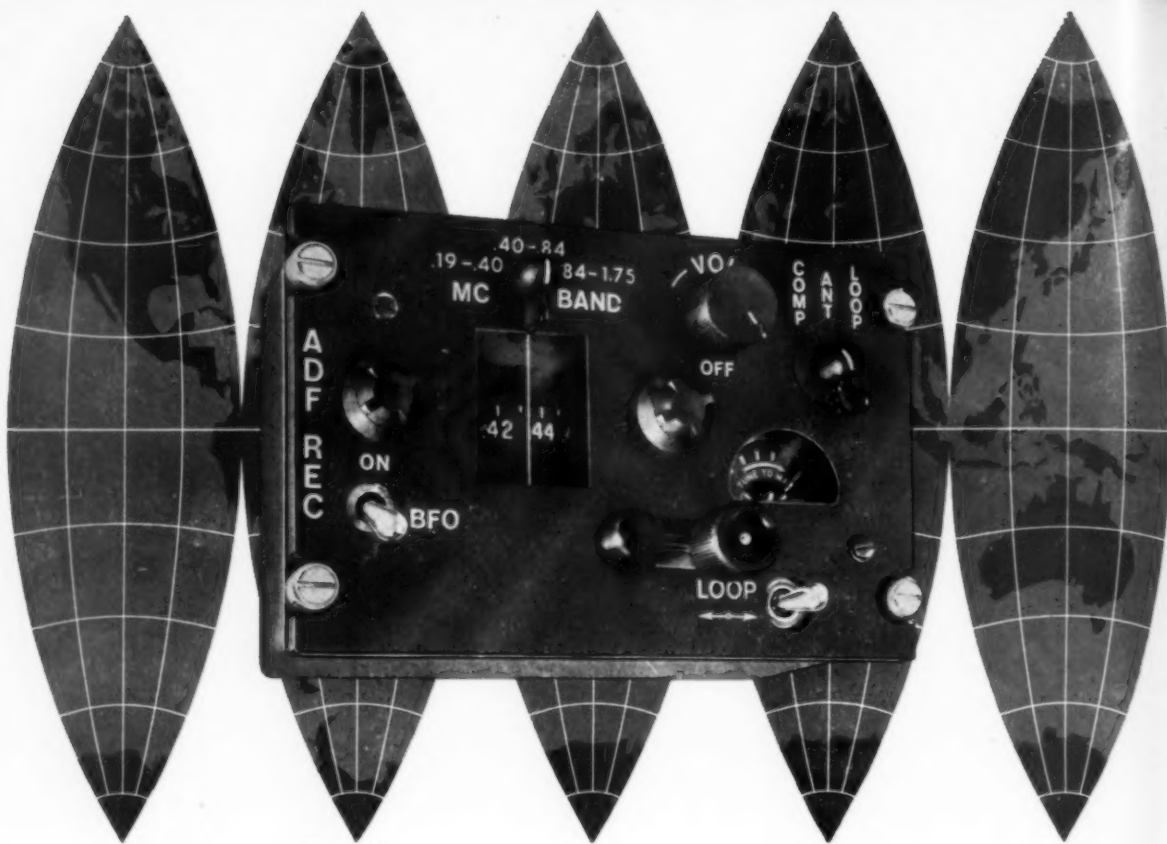
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**Boondoggling in ICAO?**

Those delegates to the International Civil Aviation Organization who are attempting to keep boondoggling and expanded bureaucracy out of ICAO in Montreal are worried about the continuing pressure exerted by Henri Bouche, the French delegate, for more and more economic studies requiring more and more people. Bouche doubles in brass between his ICAO representation and his activities as head of the Institut du Transport Aerien, a research outfit in Paris which, incidentally, produces (for fees) economic studies on air transport.

**Vignette of a lawyer**

Clinton Hester, whose fun-loving, roistering activities set high records when he was the first Administrator of Civil Aeronautics from 1938 to 1940, is now a big-shot attorney of much political influence in Washington. He has prospered mightily since he was a minor tax lawyer in the Treasury Department and drafted the present Civil Aeronautics Act for the White House. He entertains prominent people lavishly at his big farm and hunting preserve in Virginia, prefers to forget about his some-

what sensational but undistinguished performance as head of CAA. And naturally he's long since forgotten his aviation acquaintances of the CAA days. But his tax business is awfully good.

**'Hot-rod' F-106s**

Convair F-106s at Edwards Air Force Base, which formerly had fluorescent red tails for identification purposes, now have complete fluorescent red paint jobs to make them even more readily visible. So the boys at Edwards jazzed up first such paint job with white sidewalls on the tires and a white squirrel tail hung on the pitot tube. A wag at the base suggested the hot-rod look could be made complete by dangling a pair of over-size dice inside the canopy.

**Beepski, Beepski—Yanknik!**

A group of engineers working on liquid rocket engines for ballistic missiles at the Rocketdyne division of North American Aviation have a miniature Sputnik dangling from the ceiling of their office. And dangling from the miniature Sputnik are pieces of paper on which are written: "Beepski," "Beepski," "Beepski." There also is a

"Yanknik" on the premises. But it just says: "Whee!"

**Independents want help, too**

Foreign independent airlines, some of them very important in world air transport, are expressing concern at U.S. assistance policies which would seem to favor aid to nationalized airlines only. Virtually all aid is filtered through foreign governments. Independent airlines think they should have an equal opportunity for the kind of aid which is translated into aircraft orders.

**Lose that looseness!**

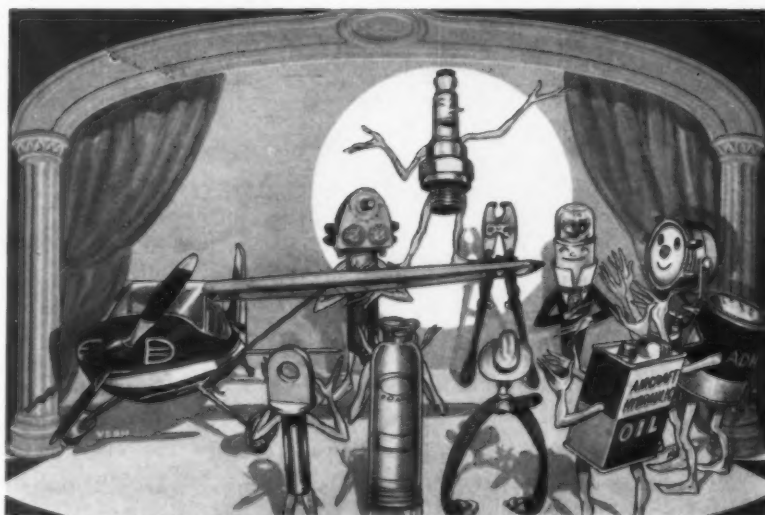
Following discovery of several foreign objects in the fuselage of a newly inspected and repaired F-86, after a washer wedged in an aileron link had caused an emergency landing, an Air Force unit grounded 23 F-86s for inspection. In nine of the aircraft, findings included two to 12 loose items, ranging from tiny washers to a six-inch screw driver and a 3/8 by 7/16 box wrench. In addition, the ejection initiator had not been connected in one aircraft.

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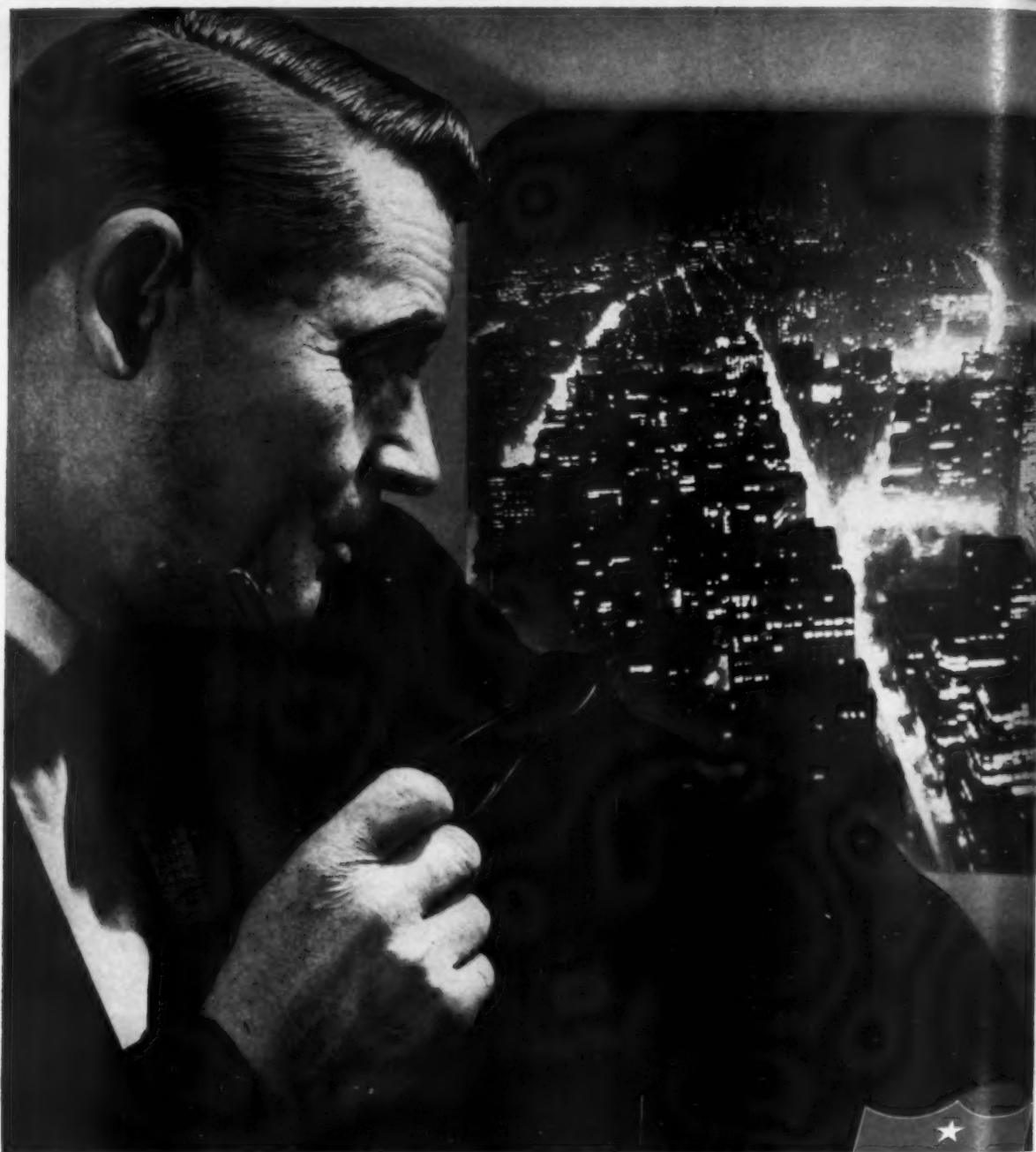


A division of Electronic Communications, Inc.

JANUARY 27, 1958

Circle No. 18 on Reader Service Card.

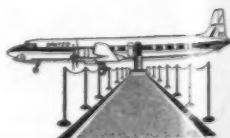
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## YOUR EASIEST WAY TO "COMMUTE"

United is first choice of businessmen who like to fly "over and back the same day." United serves more states than any other airline. It's the only one-airline service linking the East, Midwest, all the Pacific Coast and Hawaii—connecting 80 cities in the nation's greatest industrial areas. When you use United's fast "commuter" service you can spend a full day up to 700 miles away, be back home that night.

Copy. 1957 United Air Lines



AMERICAN AVIATION

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JANUA

by Anthony Vandyk

## South American way: 16 airlines compete on 125-mile hop

**BUENOS AIRES**—You can virtually name your aircraft and airline for the 125-mile flight over the River Plate from here to Montevideo, the capital of Uruguay. There can be no other two cities that enjoy such a variety of service. All told, there are 16 airlines competing.

Two Argentine and two Uruguayan airlines carry the bulk of the traffic between the two capitals but quite a few travelers use the long-haul aircraft of U.S., Brazilian, Chilean and European carriers to make the 50-minute hop.

The most convenient way to fly from Buenos Aires to Montevideo is to take one of the flying-boat schedules. Both Aerolineas Argentinas

and Uruguay's CAUSA operate shuttle services between the port areas of the two capitals with Short Sandringhams.

Almost as near to downtown Buenos Aires as the flying-boat base is the city's Aeroparque airport. This little field is used by Argentina's new private-enterprise Transcontinental and Uruguay's PLUNA for their services to Montevideo, using DC-3s and C-46 Commuters, respectively.

Whenever possible travelers between the two capitals avoid services that use Buenos Aires' Ezeiza airport.

Although this has the most magnificent terminal facilities in South

America it has one great disadvantage, particularly for the Montevideo commuter—it is 30 miles from downtown Buenos Aires. Ezeiza is the end of the line for PAA, Panagra, four Brazilian airlines and several European carriers.

For the flight to Montevideo from Ezeiza there is a wonderful choice of carriers and equipment: PAA, Panair do Brazil, KLM, SAS and Swissair (DC-7C); Air France, Iberia and Lufthansa (Super Constellation); Alitalia and Linea Aerea Nacional de Chile (DC-6B); Cruzeiro do Sul, REAL and Varig, all Brazilian airlines (Convair). What a selection!

### BRIEFS

A new Uruguayan carrier, **Atlantic Airlines**, plans to start operations between South America and Europe in late March. Authorized capital is about \$7 million, of which about \$750,000 has been paid in so far. Ownership is 50% in the hands of Uruguayan interests, 25% U.S. and 25% French. Atlantic plans to operate a thrice-weekly service to Europe from Montevideo via Sao Paulo, Rio de Janeiro and Dakar. Two flights will go to Lisbon, Madrid and

Rome, while the third will go to Lisbon, Zurich and Frankfurt. A route to London is to be opened later. Atlantic Airlines will operate four Constellations. It is also buying an F-27 from Fairchild Engine & Airplane Corp. to connect the long-haul flights with Buenos Aires.

**Hunting Aircraft** is asking airlines for their views on a 40-48-seat aircraft capable of 460 mph which the British company proposes to build. It is designed for feeder service and can be operated from any airfield from which DC-3s now fly. Design calls for a pressurized low-wing monoplane with tricycle landing gear, a high set tail and two Bristol

Orpheus jet engines.

The **Saab-35 Draken** will enter service with the Swedish Air Force in about a year. A version with a speed close to Mach 2 will go into service in the early 1960s. This version will be armed with air-to-air rockets and guided missiles. The Saab-35 will also be equipped with an entirely new fire-control system permitting collision-course tactics. With the new system, speed superiority is not required from the fighter for the interception and, in addition, the risk of being shot down by the bomber's defensive armament has been practically eliminated, Swedish sources report . . .

## How European airlines' traffic is expected to grow between now and 1970

Passenger traffic of European airlines will increase tremendously between now and 1970, according to a study made by Convair's Airline Analysis Group at San Diego, Calif. The

forecast indicates an average annual rate of increase of more than 11% each year. Table below lists billions of revenue-passenger-miles and percentage increases, 1950 through 1970.

	TOTAL		INTERCONTINENTAL		DOMESTIC		INTRA-EUROPEAN		NORTH ATLANTIC		
	Billions of rev.-pass.-mi.	% Increase	% of Total	Billions of rev.-pass.-mi.	% Increase	% of Total	Billions of rev.-pass.-mi.	% Increase	% of Total	Billions of rev.-pass.-mi.	% Increase
1950	2,852	...	57.0	1,625	...	19.6	.565	...	23.4	.667	...
1951	3,430	20.3	57.6	1,975	21.5	19.3	.662	18.2	23.1	.793	18.9
1952	3,967	15.7	57.5	2,281	15.5	19.3	.767	15.9	23.2	.919	15.9
1953	4,607	16.1	55.7	2,585	12.5	19.4	.893	16.4	24.9	1,149	25.0
1954	5,249	13.9	52.8	2,771	8.0	20.7	1,086	21.6	26.5	1,392	21.1
1955	6,181	17.8	51.8	3,201	15.5	20.3	1,255	15.6	27.9	1,725	23.9
1956	7,210	16.6	52.7	3,800	15.8	19.6	1,410	15.1	27.7	2,000	20.3
1957	8,330	15.5	52.8	4,400	15.8	19.3	1,610	14.2	27.9	2,320	16.0
1958	9,530	14.4	52.5	5,000	13.0	19.4	1,850	14.9	28.1	2,680	15.5
1959	10,930	14.7	52.6	5,750	12.7	19.2	2,100	13.5	28.2	3,060	14.9
1960	12,420	11.3	52.5	6,520	13.4	19.2	2,380	15.3	28.3	3,520	14.3
1961	14,370	15.7	52.9	7,600	16.6	18.9	2,720	14.3	28.2	4,050	15.1
1962	16,150	12.4	52.6	8,500	13.3	18.9	3,050	12.2	28.5	4,600	14.1
1963	18,000	11.8	52.5	9,450	11.2	18.9	3,400	11.5	28.6	5,150	13.2
1964	20,100	11.6	52.2	10,500	11.1	18.9	3,800	11.8	28.9	5,800	12.6
1965	22,300	10.9	51.9	11,570	10.2	19.0	4,230	11.3	29.1	6,500	12.1
1966	24,300	9.0	51.4	12,500	8.0	19.3	4,700	11.1	29.2	7,100	10.9
1967	26,500	9.1	51.0	13,520	8.2	19.5	5,180	10.2	29.4	7,800	9.9
1968	28,500	7.5	50.2	14,320	5.9	19.9	5,680	9.6	29.8	8,500	9.0
1969	30,400	6.7	50.0	15,210	6.2	20.0	6,090	7.2	30.0	9,100	7.1
1970	32,100	5.6	49.8	16,000	5.2	20.2	6,500	6.7	29.9	9,600	5.5
Average Annual											
Rate of Increase	11.5			11.1			11.8			12.7	
										12.6	

NOTE: Intercontinental Traffic includes North Atlantic Traffic.



# Summary of U.S. airline traffic for November 1957 vs. November 1956

Compiled by American Aviation Publications from Official CAB Data

Airlines	Revenue Passengers	Revenue-Passenger-Miles (In Thousands)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1957	1957	1956	% Change	1957	1956	% Change	1957	1956
<b>DOMESTIC</b>									
American	598,381	354,928	366,169	-3.1	42,736,400	45,934,164	-7.1	51.9	58.1
Braniff	179,609	70,887	62,580	13.3	7,616,292	6,698,915	13.7	44.5	48.7
Capital	349,489	124,912	95,038	31.4	13,093,010	9,896,941	32.3	46.8	46.4
Continental	69,942	29,311	21,009	39.5	3,072,326	2,216,443	38.6	39.0	45.7
Delta	237,014	101,844	90,954	12.1	11,223,585	10,041,429	11.8	51.1	53.3
Eastern	659,742	320,655	282,516	13.5	33,233,298	32,095,357	3.5	50.8	46.1
National	103,205	61,353	66,980	-8.4	6,695,484	7,593,203	-11.8	41.8	61.3
Northeast	65,487	26,121	8,824	196.0	2,645,080	867,621	204.9	35.0	52.4
Northwest	110,049	67,750	63,098	7.4	7,862,552	7,651,054	2.8	44.7	51.0
Trans World	370,295	261,692	250,767	4.4	28,604,690	28,215,014	1.4	46.6	50.6
United	496,782	331,009	310,236	6.7	39,324,225	37,709,435	4.3	52.4	54.1
Western	118,123	50,895	46,281	10.1	5,410,130	4,975,988	8.7	41.6	52.2
<b>TOTALS</b>	<b>3,358,118</b>	<b>1,801,357</b>	<b>1,664,452</b>	<b>8.2</b>	<b>201,517,072</b>	<b>193,895,564</b>	<b>3.9</b>	<b>48.8</b>	<b>52.6</b>
<b>INTERNATIONAL</b>									
American	8,263	5,944	7,322	-18.8	955,279	1,085,435	-12.1	58.2	61.8
Braniff	3,778	7,526	5,793	29.9	922,262	789,229	19.9	43.0	53.0
Delta	5,408	6,221	5,081	22.4	748,800	581,298	28.8	50.3	47.4
Eastern									
San Juan	20,184	28,691			3,112,255			56.7	
Bermuda	2,319	1,820	24,695	41.5	193,036	2,854,147	33.4	37.1	49.7
Mexico	2,942	4,439			502,438			39.4	
National	3,707	2,945	3,996	-26.3	371,963	466,362	-20.2	33.2	41.9
Northwest	9,102	18,796	15,396	22.1	3,750,923	3,674,340	2.1	64.9	66.3
Hawaiian	1,163	3,033	1,716	76.7	346,553	219,554	57.8	57.7	53.7
Panagra	11,910	13,599	15,114	-10.0	2,027,875	2,073,096	-2.2	59.7	63.9
Pan American									
Latin America	94,306	89,197	83,586	6.7	14,373,230	13,011,759	10.5	61.6	63.6
Atlantic	76,569	90,114	91,877	-1.9	12,887,794	13,622,019	-5.4	57.5	64.0
Pacific	22,824	69,887	74,957	-6.8	9,904,649	10,481,913	-5.5	59.8	63.1
PDX/SEA-HON	1,215	3,169	3,103	2.1	343,333	348,131	-1.4	45.3	35.9
Alaska	2,896	3,585	6,625	-45.9	534,722	999,238	-46.5	50.0	49.1
Trans World	19,585	49,541	43,609	13.6	6,802,160	6,163,251	10.4	60.6	68.3
United	6,569	16,320	13,202	23.6	1,822,084	1,504,962	21.1	53.0	47.9
Western	2,211	3,438			384,166			67.5	
<b>TOTALS</b>	<b>292,573</b>	<b>412,063</b>	<b>391,253</b>	<b>5.3</b>	<b>58,841,626</b>	<b>57,287,049</b>	<b>2.7</b>	<b>58.2</b>	<b>61.8</b>
<b>LOCAL SERVICE</b>									
Allegheny	35,416	5,976	5,544	7.8	612,061	562,627	8.8	43.0	46.6
Bonanza	13,159	2,829	2,421	16.8	282,654	242,593	16.5	42.5	43.8
Central	9,953	1,866	1,633	14.3	192,138	167,962	14.4	29.4	29.4
Frontier	19,263	4,650	4,196	10.8	526,883	476,446	10.6	57.1	54.6
Lake Central	13,482	2,982	1,946	7.5	216,690	199,591	8.6	38.1	42.8
Mohawk	38,737	6,981	6,203	12.2	705,475	619,148	13.9	48.0	56.4
North Central	49,501	7,515	6,446	16.6	774,809	660,888	17.2	43.0	44.2
Ozark	28,670	4,720	4,314	9.4	485,609	439,453	10.5	43.7	40.8
Piedmont	33,472	6,462	6,175	4.6	650,506	631,555	3.0	49.8	51.7
Southern	16,285	2,909	3,022	-3.7	297,373	308,667	-3.7	35.7	43.9
Southwest	28,790	6,348	5,403	17.5	623,978	532,686	17.1	49.3	49.1
Trans-Texas	18,269	3,954	4,382	-9.8	417,939	461,308	-9.4	38.1	36.1
West Coast	22,464	3,494	2,735	27.8	343,709	262,588	30.9	42.5	50.2
<b>TOTALS</b>	<b>327,461</b>	<b>59,776</b>	<b>54,420</b>	<b>9.8</b>	<b>6,129,834</b>	<b>5,565,452</b>	<b>10.1</b>	<b>44.0</b>	<b>45.6</b>
<b>ALASKAN SERVICE</b>									
Alaska Airlines									
States	440	676	455	48.6	232,766	295,688	-21.3	35.6	47.0
Intra	4,455	1,217	1,409	-13.6	230,499	365,137	-36.9	45.6	53.0
Alaska Coastal	2,938	257	235	9.4	35,039	32,090	9.2	63.8	67.4
Cordova	897	164	209	-21.5	24,035	41,525	-42.1	42.4	49.6
Ellis	2,938	169	181	-6.6	21,040	22,449	-6.3	65.8	71.6
Northern Consolidated	1,136	374	537	-30.4	108,532	338,536	-67.9	63.7	81.6
Pacific Northern	7,597	6,049	5,270	14.8	951,403	925,348	2.8	54.0	53.9
Reeves	1,021	695	239	190.8	147,391	70,025	110.5	51.9	73.5
Wien	1,499	403	1,091	-863.1	151,998	659,647	-876.9	56.6	92.1
<b>TOTALS</b>	<b>22,921</b>	<b>10,004</b>	<b>9,626</b>	<b>3.9</b>	<b>1,902,703</b>	<b>2,750,445</b>	<b>-30.8</b>	<b>50.4</b>	<b>62.1</b>
<b>HELICOPTER SERVICE</b>									
Chicago Helicopter	7,568	109	7	1457.1	11,733	2,727	330.4	26.9	26.8
Los Angeles Airways	1,989	73	73	0.0	12,077	13,205	-8.5	51.4	37.5
N. Y. Airways	5,114	99	92	7.6	12,294	11,749	4.6	39.5	38.8
<b>TOTALS</b>	<b>14,671</b>	<b>281</b>	<b>172</b>	<b>63.4</b>	<b>36,107</b>	<b>27,681</b>	<b>30.4</b>	<b>36.8</b>	<b>36.6</b>
<b>TERRITORIAL SERVICE</b>									
Caribair	17,359	1,207	973	24.0	131,486	91,966	43.1	55.5	61.9
Hawaiian	31,236	4,332	4,095	5.8	467,522	458,694	2.4	53.3	55.1
Trans-Pacific	14,272	1,765	1,526	15.7	151,186	132,667	14.1	54.4	51.9
<b>TOTALS</b>	<b>62,867</b>	<b>7,304</b>	<b>6,594</b>	<b>10.8</b>	<b>750,194</b>	<b>681,327</b>	<b>10.1</b>	<b>53.9</b>	<b>55.1</b>

NOTE: 1956 passengers are not shown due to non-compatibility of these statistics for comparison purposes.

## HONORS

Whitley C. Collins, president of Northrop Aircraft, has been elected president, Los Angeles post, American Ordnance Assn.

Thomas S. Banes has been appointed Director of the Air Navigation Bureau and Asst. Secy. General of the International Civil Aviation Organization.

Arthur C. Smith, Western Air Lines sales administration director, was elected

president of the American Convention and Travel Institute.

George C. Neuschaefer of the United States Naval Material Laboratories received the first annual National Reliability Award at the 1958 Symposium on Reliability and Quality Control.

# PEOPLE



HULL



PELFREY



LENAY



ROWAN



CHAPLINE



FOX

## Manufacturing

Name	New Position
Dr. Harvard L. Hull	Pres., Nucledyne Corp., subsidiary of Cook Electric Co.
Lowell S. Pelfrey	Dir. research and development, International Rectifier Corp.
Thomas W. LeNay	VP, Perkin Engrg. Corp.
John W. Rowan	Service mgr., Detroit Aero Hydraulics Service Sect., Vickers Inc.
George F. Chapline	Dir. military requirements, Fairchild Engine and Airplane Corp.
Leonard S. Hobbs	Retires Apr. 1
Aubrey Keif	Dir. Texas Co. aviation sales dept.
Kenneth J. Boedecker	Retired
F. E. Newbold, Jr.	Gen. mgr., Engine Div., Fairchild Engine and Airplane Corp.
J. R. Roden	Gen. sales mgr., Oakland Automotive Co.
Irwin I. Steinberg	Gen. mgr., Vibro-Ceramics Div., Gulton Industries, Inc.
William L. Dunn	VP and dir. engrg., Admiral Corp.
Bernard A. Schmickrath	Asst. engrg. mgr., Pratt & Whitney Aircraft
Stanley N. Golembie	Exec. vp, Power Sources, Inc.
Dr. Wayne H. Jens	Asst. tech. dir., Atomic Power Development Associates, Inc.
John Wayner	Western regional sales mgr., San Fernando Electric Mfg. Co.
Sir Leslie J. V. Bates	Sales consultant and rep., Eagle Aircraft Services Limited
Rea Anderson	Chief metallurgist and head, quality control, Standard Steel Corp.
John G. Booth	Gen. mgr., Davies Laboratories Div., Minneapolis-Honeywell Regulator Co.
Russell W. McFall	VP, Litton Industries, and gen. mgr., Maryland Div.
Michael E. Madden	Mgr. production programming and control dept., Aircraft Engine Div., Ford Motor Co.
Robert M. Rashkin	Quality supvr., Advance Gear and Machine Corp.
John L. Wandrisco	Mgr. mktg., Latrobe Steel Co.
Robert A. Ferguson	Mgr. sales promotion, Latrobe Steel Co.
Ralph N. Conner	Southwestern dist. mgr., Baldwin-Lima-Hamilton Corp.
Chester W. Holmes	Asst. to pres., United Aircraft Products, Inc.
J. W. Farnell	Labor relations mgr., Georgia Div., Lockheed
Frank J. Cumiskey	Mgr., Mktg. Div., International Business Machines Corp.
Mal. Gen. Frank E. Stoner (USA, ret.)	Asst. to pres., Varian Associates
Frank P. Coyer, Jr.	Treas., Kelsey-Hayes Co.
Dominick N. Salerno	Controller, Circuit Instruments, Inc.
Theodore R. Treff	Controller, Bell Helicopter Corp.
Dr. Karl M. Mayer	Dir. econ. research, Nuclear Products-Erco Div., ACF Industries
Robert B. Wiltshire	Corporate insurance mgr., General Dynamics Corp.
Richard A. Maher	VP-engrg., Hoffman Laboratories, Inc.
William G. Orr	Dir., support services programming, The Garrett Corp.
Joseph M. Martin, Sr.	Mgr., design dept., DataLab, div. of Consolidated Electro-dynamics Corp.
Paul L. Ashway	Mgr., fabrication services, DataLab, div. of Consolidated Electro-dynamics Corp.
Robert A. Slater	Mgr., mfg. engrg., Metallurgical Products Dept., General Electric Co.
Philip DiPalco	Chief engr., LeMaire Tool & Mfg. Co.
Thomas Allinson	Pres., Daystrom-Weston Co.
H. Clay Oliver	Gen. supt., Fulton Siphon Div., Robertshaw-Fulton Controls Co.
Graddon F. Willard	Production mgr., Muskogee Div., Callery Chemical Co.

## Former Position

VP, Litton Industries, Inc.
Engineer
Chief development engr.
Chief, Piston Unit Development Group
Gen. mgr., Engine Div.
Vice chairman, United Aircraft Corp.
Mgr. domestic aviation sales
VP-sales, Curtiss-Wright's Wright Aeronautical Div.
VP and gen. mgr., Stratos Div.
VP, Pacific Aero Industries
Dir. pub. rel. and adv.
Gen. mgr., military and special products div., Warwick Radio Corp.
Gen. mgr., Canel operation
Mgr. mfg., Laboratory for Electronics
Project engr., Nuclear Development Operation of America
Salesman
Dir. general of equipment, Royal Air Force
With Rheem Mfg. Co.
Mgr. systems engrg. dept., Industrial Div.
In chg., nose-cone research and development
Asst. mgr.
Staff asst. for gears, AirResearch
Gen. mgr., Special Products Div.
Sales mgr., Special Products Div.
Asst. mgr.
With General Motors Corp.
Industrial rel. mgr., Missile System Div.
Branch mgr., Bethlehem, Pa.
Dir. program planning
Asst. treas.
Sr. cost estimator
Chief accountant and asst. secy.
Industrial economics consultant, Stanford Research Institute
With The Martin Co.
Chief engr.
Asst. mgr., Air Cruisers Div.
Chief production engr., Servomechanisms, Inc.
VP, William Miller Instruments, Inc.
Sr. mfg. engr., Schenectady
Chief engr., Spartan Design, Inc.
VP mktg.
Purchasing agent
Chief project engr.

## Airline

Bonham M. Fox	Dir., passenger sales, American Airlines
Remington R. Taylor	Dir. maintenance operations, Mohawk Airlines
Patricia Ann Farrell	Mgr., women's promotion, Pan American World Airways
Ake Rusck	Pres., Scandinavian Airlines System
A. C. Campbell-Orde	Resigned
J. G. Helvey	VP and gen. mgr., AAXICO Airlines
Mrs. Olympia A. (Lee) Meenan	Personnel mgr., Bonanza Air Lines

District sales mgr., Chicago
Asst. to vp-operations
Supv. women's activities, Oil Information Committee, American Petroleum Inst.
Pres., Swedish State Power Board
Development director, British Overseas Airways Corp.
VP-operations
Secy. to supt. of maintenance.

## Government

James E. Gildea	Asst. dir., air transportation, Post Office Department
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A.s.t. dir., transport research, Bur. of Transportation
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Executive Aircraft for Immediate Delivery

See them at **Pompano Beach Airport**

— by Hillsboro Lighthouse, Florida



**Super E-18 Beechcraft**—Trade in on new Super-92 DC-3. Like new, mfg. May, 1956, 490-hours total. Many extras, with outer wing tanks, flowmeters, deicers, 100 amp generators, Geisse gear, stick shaker, double windows, oxygen, dual instrumentation, Sperry C4 gyrosyn compass and H5 electric horizon, dual Collins 51R with omni, RMI with ADF-Omni switch controls, Collins 17L6-51R VHF communications wired like 51X, Collins 51V glide slope and 51Z 3 marker, LVTR-36 standby VHF, dual lightweight Wilcox 701 ADF, A.R.C. isolation amplifier with speakers, etc.

**Grumman Goose**—New three-bladed full-feathering props, all-metal wing, new relicense with fresh overhaul on airframe and engines (with crankshaft modification). New executive interior, new exterior paint. Another Goose also available, now beginning overhaul, ready for your specifications.

**Airline DC-3**—26 seat, ready to go. Janitrol heat, dual instrumentation, dual Collins 51R omni, dual ILS, dual ADF, dual VHF transceivers, 3-light marker, isolation amplifier, etc. \$110,000.



**Deluxe Super-92 DC-3**—New-ship guarantee on airframe, 800-hour guarantee on engines. Completely disassembled and rebuilt. Luxurious interior, with all large cabin and picture windows. Lightweight landing gear doors, Collins and Bendix executive radio, many extras. Today's fastest and quietest DC-3, 210 miles per hour.

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## EN ROUTE

by Wayne W. Parrish

### Well-upholstered editor gets special seat

AN AWFUL LOT of nice things happen to me but the latest to rock me back on my heels in amazement came from Hardman Tool & Engineering Co., Los Angeles, the well-known designers and manufacturers of airplane seats. So I interrupt the series on Australia to report the news.

Unbeknownst to me, there had been a conspiracy involving Nick Ball, of Hardman; Fred Hunter, West Coast manager for AMERICAN AVIATION, and my wife, all pointed in the direction of a specially-designed leather chair modeled along airplane seat lines to be delivered to me as a Christmas present.

Also involved in the conspiracy, quite naturally, were Frank and Stan Hardman, and that wise, irrepressible veteran of aviation advertising, Al Essig, a landmark in Southern California. And they tell me the shop people took special pride in turning out the job.

Well, the seat arrived by American airfreight a few days before Christmas and was duly delivered to my house. It's a beauty. It has the finest turquoise-colored leather obtainable and a classy design. It has a footrest which pulls out, reclines just like an airplane seat, but also revolves. It's got everything.

It was a most pleasant surprise, believe me, but that wasn't all that came along. Somewhat after Christmas I received a framed bit of verse and art work, handsomely done up, which I've reproduced on this page. I don't know who did the poetry, but whoever it was threw caution to the winds and immortalized a few episodes of my travels for better or for worse.

So, a million thanks to Frank and Stan Hardman, Nick, Al and the boys in the HT & E shop, for a fine, comfortable and good-looking contribution to my study. Even if I don't deserve such nice things, I accept them with due gratitude. My next problem is to bounce my wife out of the seat so I can use it; she thinks it's just the thing for TV viewing.

### Running behind schedule

I'm running far behind on writing up my travels. I have more to go on Australia, then New Zealand, then a 5,000-mile trip in Europe with a Mercedes-Benz 219 (a wonderful car), trips on Central and Lake Central, and lots of other items. But bear with me—I'll get caught up in due course. I hope. (I was in Australia and New Zealand last March.)

Meantime, I lost ground in 1957 on my hobby of hitting every airport in the U.S. served by a scheduled carrier. I hit 13 new ones but more were opened up, so I have 72 to go in contrast to 69 a year ago. There are now 550 airports being served. I hope to knock off a lot this year.

New ones hit were Fitchburg, Mass., and Berlin, N. H., on Northeast; Liberal,

Kansas, Guymon, Okla., and Lamar, Col., on Central; Lima, New Philadelphia, Zanesville and Portsmouth, all in Ohio, on Lake Central, and Bloomington, Kokomo, Lafayette and Marion, all in Indiana, on Lake Central.

I have completed all airports in 11 states and have been on all carriers—the last, Lake Central, was done up brown in 1957. I have five stops to hit in North

Carolina, and four in California, Florida, South Dakota and Utah, but only one stop to go in 17 states.

I've held off on some routes because of uncompleted CAB route cases; I'll wait until they're finalized. I've also held off in some cases because a batch of local stops are going to be suspended. With a little luck and fortitude, I can cut in half the number of airports to go in 1958.

### The Saga of WWP

'Twas the night before Christmas, the time we get dreamy.  
Nothing was stirring, not even a martini!  
And Wayne had stretched out for a holiday snooze,  
He'd shed all his cares, yes, even his shoes.

His ears caught the roar of a "Connie" in flight  
And he was off on a voyage far into the night.  
He'd relive his visits to far away places  
Where exotic natives "No speaka Ingleses!"

He flew the Atlantic to the Folies Bergere,  
Took a side trip to Russia and Moscow's Red Square.  
He missed out on Sputnik, but he did ogle Olga,  
A proletarian dish who lived on the Volga.

But Dark Africa beckoned, so Wayne flew Sabena  
To a primitive land without a latrine.  
He safaried his way into the hinterland veldt  
Where pigmies wore no pants, not even a belt!

We'll skip a few continents to cut down our rhyme  
And land in Australia at sausage time.  
Wayne had come to Australia with anticipation,  
But those sausages brought on only regurgitation!

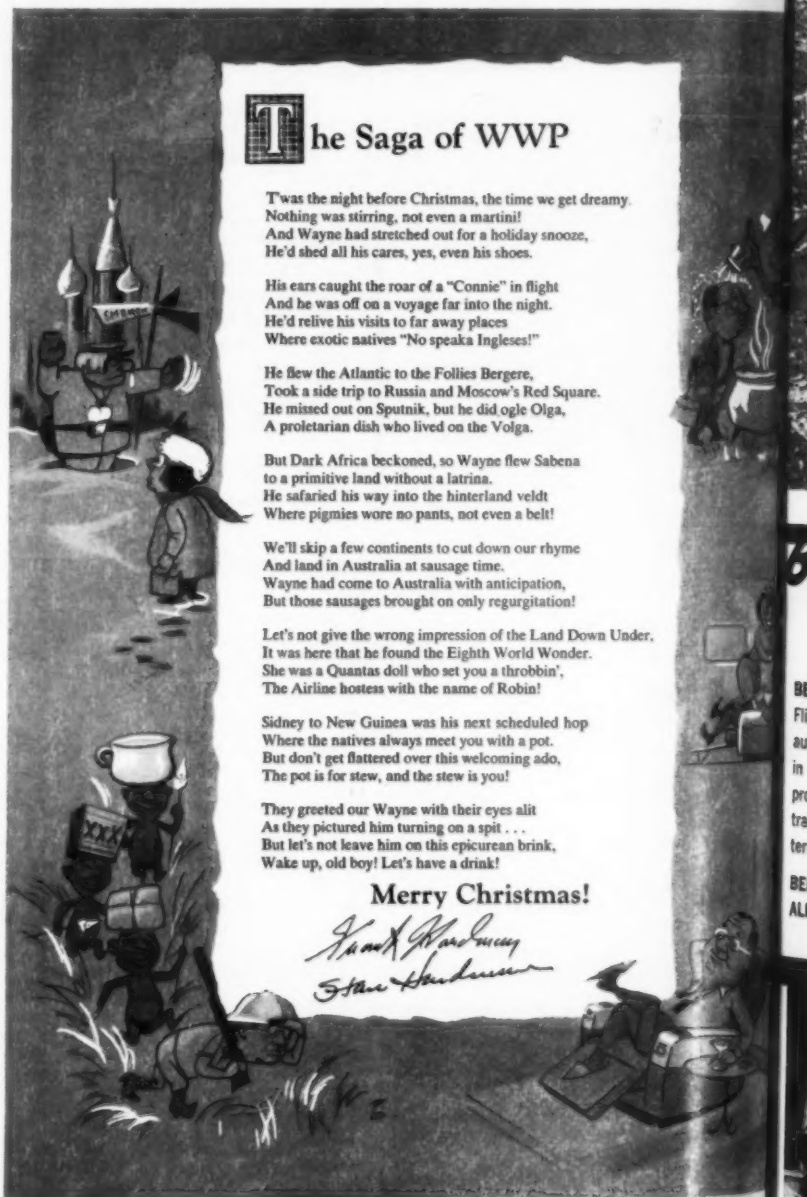
Let's not give the wrong impression of the Land Down Under,  
It was here that he found the Eighth World Wonder.  
She was a Qantas doll who set you a throbbin',  
The Airline hostess with the name of Robin!

Sidney to New Guinea was his next scheduled hop  
Where the natives always meet you with a pot.  
But don't get flattered over this welcoming ado,  
The pot is for stew, and the stew is you!

They greeted our Wayne with their eyes alit  
As they pictured him turning on a spit . . .  
But let's not leave him on this epicurean brink,  
Wake up, old boy! Let's have a drink!

Merry Christmas!

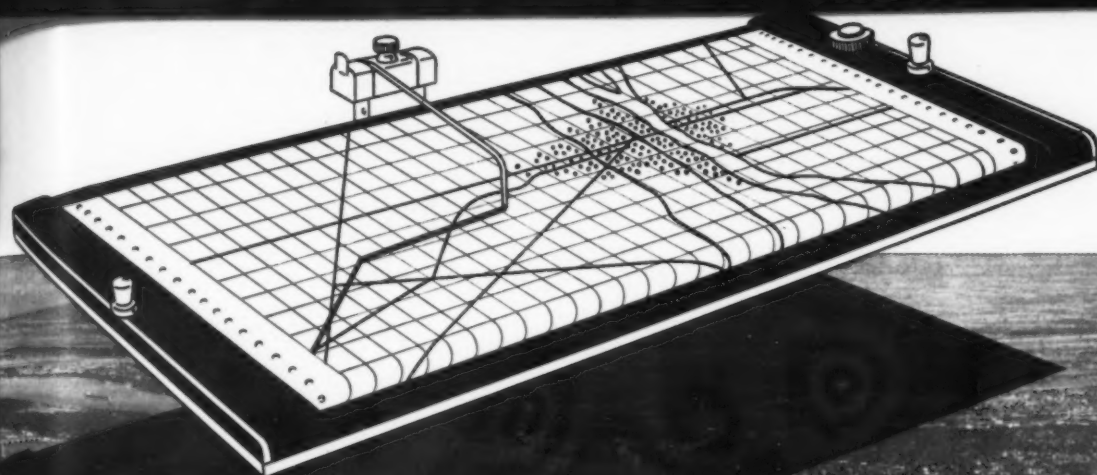
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